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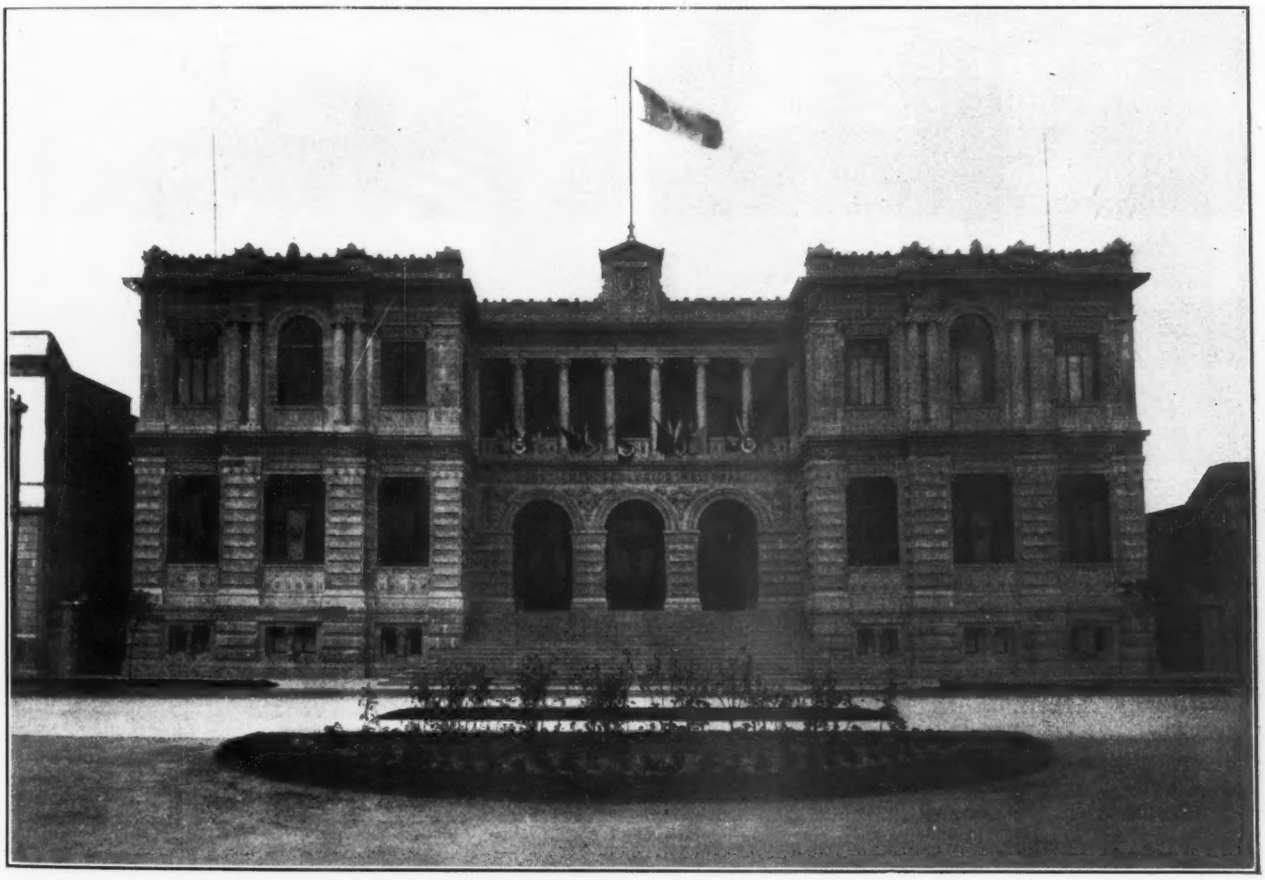
The Instituto Geologico de Mexico

A Commendable Government Undertaking—Purposes, Plans and Present Work of Institute—Investigations of Geologic and Seismic Phenomena

BY JOSE G. AGUILERA*

The Mexican government, realizing the advantages offered to the country by a careful study of its geology, presented before congress on May 26, 1886, through the department of fomento the plans for the formation of a Geological Institute. Its purposes were to be the geological study of the territory and the making known of these studies from a scientific, technical and industrial standpoint; to form and to publish the geological map of the Republic accompanied by a carefully written report; to publish special maps and studies on the most interesting regions of the country, such as mining districts, complex structures, important mountains, etc., and to establish and preserve a geological museum with classified collections which might serve in the preparation of original maps, etc.

In March, 1888, the secretary of fomento, General Carlos Pacheco, furthering the efforts of Antonio del Castillo, obtained from the President of the Republic permission to organize a Geological Commission, which would take charge of the formation of a geological and mining map of the Republic, while congress passed upon the initiative for the organization of the Geological Institute.



BUILDING OF THE INSTITUTO GEOLOGICO DE MEXICO

Work of the Institute

Work was confined at first to the formation of a general geological map, and a mining map of the country. The first of these was designed to give a general idea of the dominant and most important formations, and at the same time to serve as a basis for more perfect and detailed work to be done later on. The mining map was to show the country from an economic standpoint, a thing of great importance owing to the vast number of veins in the land, and the diversity of mineral substances contained by these veins. In the meantime careful and accurate statistical work was being done in order to make known the true value of the country's mineral wealth in a state of exploitation, as well as of that which may claim the initiation of new enterprises and new energies. In 1888, by decree of congress, the formation of the Geological Institute was approved, and, at the beginning of 1891, the Geological Commission that had taken

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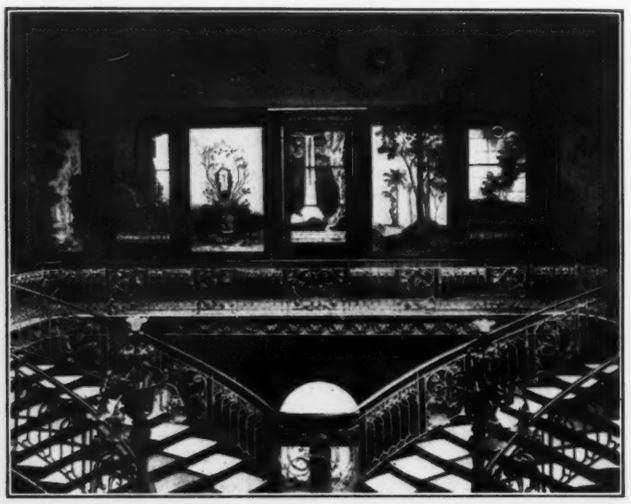
charge of the preliminary work was converted into that institute. This is therefore a national institution, created by a decree of congress, established in 1891 and dependent on the department of fomento, its object being the permanent geological service of the Republic.

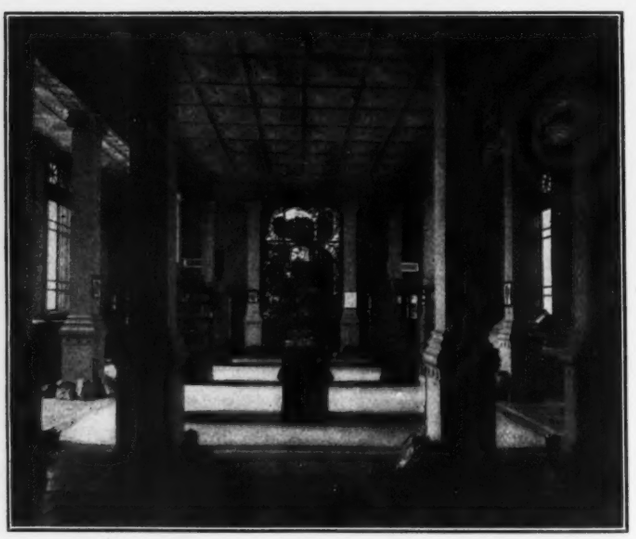
This staff is subdivided for the performance of its duties in nine sections as follows: (1) Mineralogy and petrography; (2) General geology; (3) Stratigraphical geology; (4) Paleontology; (5) Economic geology; (6) Chemistry and metallurgy; (7) Topography; (8) Drawing; (9) Administration.

PALEONTOLOGICAL MUSEUM



CORRIDOR AND STAIRWAY

MAIN STAIRWAY IN THE INSTITUTE BUILDING



SALON ON MAIN FLOOR

The Geological Map

For the formation of the detailed geological map the work accomplished by the Geographical Commission is available, in the form of the topographical sheets prepared and published by that commission on a scale of 1:100,000. These sheets must first be completed and corrected by locating with accuracy points that are important in the mapping of formations; by mapping accurately the contour lines to give an exact idea of the geographical relief; and by constructing a first-class triangulation system, to cover the area to be studied, based on the astronomical determinations of the Geographical Commission. Upon this first-class triangulation, a secondary one is based, and from the latter the detail work is started, following water courses and ridges and determining locations by direction and distance, and elevations with the aneroid.

Upon the corrected sheets the rocks of the various formations are mapped and all points where rocks, minerals or other substances of economic importance are found, are indicated. These maps which give a general idea of the geology are accompanied by sections, profiles and views that give a closer notion of the appearance and structure of the ground, and by other maps indicating the possible or actual industrial application of the rocks. On separate sheets are indicated springs, wells and water currents, with the catchment areas, and advice which is thought will lead to the better usage of the waters. These hydrographic sheets have also all the known data on underground waters, and all that can be said on the courses and feed sources of said waters.

The detailed geological map will, therefore, contain all information relative to the ground which can be utilized and will thus show ultimately the natural elements of wealth in the Republic. It will be published in 1101 sheets to the scale of 1:100,000 in accordance with an accompanying diagram of the fractioning made by the Geographical Commission. Only that for better advantage the map has been divided into 57 vertical columns numbered from left to right with Roman figures and 52 horizontal zones numbered from top to bottom with Arabic figures, and each sheet is then distinguished by the most important city contained therein, and the numbers of the zone and column in which it belongs.

Other Investigations

It is the institute's purpose to study the formation of soils and to indicate the rocks from which they originate, particularly those which may serve as fertilizers. For the investigation of the nature of tillable land a chemical study of rocks has been undertaken, especially of those that, seen under the microscope, show among their constituents, phosphates or other substances that may be used for the bettering of the chemical or physical conditions of soils. In this way we will contribute something to the formation of the agronomic maps of the country; for in presenting a map of the distribution of rocks, that of the soils is understood since the clay, lime and sand of which soils are composed come from the disintegration of the country rocks.

The Geological Institute in the performance of the working plan outlined contributes to the advance of all industries with which mining is more or less intimately related, to hydrographic works and to all practical applications where a knowledge of the surface and interior of the earth is essential.

In the northern region of the state of Oaxaca topographical and geological surveys are being made, specially in the parts where there is coal. The study of the mineral deposits is in charge of Y. S. Bonillas; that of the fossil plants of the region in that of Dr. G. R. Wieland. In the south of the same state the geologic study is being finished, Dr. E. Böse being in charge of the stratigraphy and Dr. P. Waitz of the petrography.

The region of the state of Guerrero in which the last earthquakes have occurred is being studied by the commission in charge of T. Flores. Work is continued on the study of the underground hydrology of the southwest region of the valley of Mexico, in charge of J. D. Villarello. That of the valley of Ixmiquilpam, Hidalgo, has been studied by T. Paredes. The faunae of the Symon and Camacho mountains in Zacatecas are being studied by Drs. E. Böse and C. Burckhardt. In the near future a geological study will be made of the northern region of the state of Sonora, near the boundary with the United States. This work has been assigned to Y. S. Bonillas.

The network of national seismological observatories has been commenced under the direction of J. G. Aguilera, director of the institute. The central station at Tacubaya is near completion, that of Mazatlan is nearly done, the one in Oaxaca is under way and very soon the one in Chilpancingo, Guerrero, will be started. Independent of these works, those that have been started before are being continued, in general and applied geology, paleontology, mineralogy, petrography and analytical chemistry.

Publications of the Institute

No. 1. Fauna Fósil de la Sierra de Catorce, por A del Castillo y J. G. Aguilera. 1895.

No. 2. Las Rocas Eruptivas del S. O. de la Cuenca de Mexico, por E. Ordoñez. 1895.

No. 3. La Geografia Fisica y la Geologia de la Peninsula de Yucatán, por C. Sapper. 1896.

Nos. 4-6. Bosquejo Geologico de México. 1897.

Nos. 7-9. El Mineral de Pachuca. 1897.

No. 10. Bibliografia Geológica y Minera de la Republica Mexicana, por R. Aguilar y Santillán. 1898.

No. 11. Catálogos Sistemático y Geográfico de las Especies Mineralógicas de la República Mexicana. 1898.

No. 12. El Real del Monte, por E. Ordóñez y M. Rangel. 1899.

No. 13. Geologia de los Alrededores de Orizaba, con un Perfil de la Vertiente Oriental de la Mesa Central de México, por E. Böse. 1899.

No. 14. Las Rhyolitas de México (primera parte), por E. Ordóñez. 1900.

No. 15. Las Rhyolitas de México (segunda parte), por E. Ordóñez. 1901.

No. 16. Los Criaderos de Fierro del Cerro del Mercado en Durango, por M. Rangel. 1902.

No. 17. Bibliogratia Geológica y Minera de la República Mexicana, por R. Aguilar y Santillán. 1904.

No. 20. Reseña Acerca de la Geologia de Chiapas y Tabasco, por E. Böse. 1905.

No. 21. La Faune Marine du Trias Supérieur de Zacatecas, par le Dr. Carlos Burckhardt. 1905.

No. 22. Sobre Algunas Faunas Terciarias de México, por Emilio Böse. 1906.

No. 23. La Faune Jurassique de Mazapil, Zacatecas, par le Dr. Carlos Burckhardt. 1906.

No. 24. La Fauna de Moluscos del Senoniano de Cárdenas, S. L. P., por Dr. E. Böse. 1906.

No. 26. Algunas Regiones Petroliferas de México, por J. D. Villarello. 1908.

COUNCIL ROOM AND LIBRARY OF THE INSTITUTO GEOLOGICO DE MEXICO

In addition to the bulletins published by the institute, numerous *paragones* or short scientific and economic pamphlets have also been issued.

The Mexican Geographical Exploration Commission is working on topographical surveys in Chihuahua, Durango, Morelos, Oaxaca and Yucatan and has completed a map of the state of Vera Cruz and of Puebla and Morelos. The plan is to complete a large-scale map of the Republic, similar to the folio maps being prepared by the United States Government. The geodetic survey is now at work establishing a base line in the state of Tamaulipas, from which to conduct triangulations of the Gulf points. The need of correct maps in the Republic is being rapidly supplied by these and other official commissions and by private surveys.

The Sociological Side of the Mining Industry

Progress in Europe and the United States; Vast Improvement as Compared with Conditions 20 Years Ago; Good Results from Welfare Work

BY W. H. MOULTON*

The mining industry must be considered as having one paramount purpose, that of producing ore at the least possible cost and disposing of it at the highest price. Usually this is the only side of the industry that has been presented to the public or to its owners, but there seems to be another side that should command our attention. To the officer and stockholders the business must first appeal as a money-making proposition. To the public it too often appears as the taking away of the treasures of a community without making adequate return.

In the early days of mining there was little thought given to anything but the physical aspects and to how the ores might be extracted and disposed of at the highest price, with no thought of lasting improvements because the mine was considered to be always decreasing in value, while in a manufacturing enterprise the value of the business and property is always increasing, so long as it is a going concern. There was too little consideration for the man or his family. He was a factor in production and the main question was a sufficient supply of him to produce the required output.

There has now come, however, an understanding of conditions not only in the mining industry, but in all others, which has clearly indicated the necessity of studying man's relation to his family, to his neighbor, to his fellow workers and the business or occupation in which he is employed, and to the community in which he more widely lives. This is sociology.

Employer's Interest in Welfare of Men

We must study to learn of the man's relation to his work, and find out if possible the responsibility that the employer has, not only to his employee, but to the public or to the community in which his business is established. It is not to find what you may do for the man's welfare, but to find what is necessary and wise in the newer, extensive and intensive conditions of business. We can well assume that this is a duty which any business owes to the community in which its resources are developed. The man who is making the money for the enterprise is usually so occupied in this that he cannot study deeply into this personal side of it, and it is only by careful investigation and the trial of many things, not all, of course, meeting with success, that the desired result can be accomplished. The mining industry is not alone in the consideration of these problems; all others are meeting the same questions and increasing numbers are working for some solution. Across the water in the older countries and nations, the problem has come sooner and earlier work has been done upon it.

In France the mining industry early saw the need of studying the relation of its men to its own success. The work done by a large number of mining companies has been very satisfactory and of the greatest value. The coal mines of Blanzy, employing 8000 men and mining over a million tons of coal per year, has steadily increased its interest in the welfare of men. Since 1834 the company has built more than 1200 houses for its employees, selling land and houses to them at cost, and on long-time payments for little more than the usual monthly rental, and in some cases for even less than the rental established by outside interests. A mutual aid society, to which the company contributes an amount equal to that paid in by the men, provides for regular payments during injury, also hospital service, medical attendance, medicines, nursing and attending of the sick in their own homes. The company has for many years paid a retiring pension to all old employees and a pension to the widows and orphans. It supports 15 primary and six infant schools for 6000 children. It also conducts evening schools and lends its encouragement to various athletic, educational, musical and other social organizations. The company has always stood for individual initiative and encourages independent action in the 20 or more organizations which it assists.

The Work In Our Own Country

In our own country good progress is now being made. The Colorado Fuel and Iron Company has organized its sociological department, with Dr. R. W. Corwin, chief of hospital staff, in charge, and has given the most careful consideration to the welfare features of its business in connection with the life of its men. With Doctor Corwin are associated Dr. W. Morritt, as superintendent; Margaret G. Grabill, superintendent of kindergarten and domestic science; Dwight W. Baker, superintendent of the Colorado Fuel and Iron Company Normal and Industrial School; Mrs. Mary Small, matron, and 12 kindergarten teachers.

At eight different mining locations are club houses, with social halls at two other smaller places. The company has tried operating its new club at Calcite without selling liquor, and its report says: "No liquors are sold and, in fact, none are to be had in camp. There are likewise no speakeasies or blind pigs, and the men are satisfied and no time is lost after pay days because of drunkenness. This is one instance at least where the liquor problem is being successfully handled and all credit is due to the superintendent at that place." This is a small location and does not present the same difficulties as found in the larger places where the work of substituting something for the saloon is at the very least a great problem and as yet not solved. According to its last report the following plans have been in effect.

The old hospital building at Pueblo as a social center for the community serves as a home for 50 people. In this building is the night school, Young Men's Social Club, the C. F. and I. Jr. Club for boys, the Penny Savings Banks, library, tennis club, Junior Roycrofters; many socials, lectures and entertainments also are held in it. The new hospital at Pueblo is considered the finest in the country.

All drys are furnished by the company with shower baths, individual wash basins and lockers. Lectures and entertainments are frequently given and dances held. Night schools have been conducted in several of its camps with some degree of success. Women's clubs in various camps have become strong allies of the kindergarten teachers and social workers. Libraries and kindergartens are maintained at all localities where not provided by the public schools.

Surgeons give practical talks to the older scholars of the schools. Penny savings funds are encouraged. Lessons in domestic economy are given in connection with housekeeping and sewing classes. Boys' clubs are organized and picnics held. Much attention has been paid by Doctor Corwin to the building of school houses, and he has developed his plan of single-story buildings on the pavilion system, which has much merit, especially in a climate where the weather conditions are not too severe. The following summary in Doctor Corwin's report is a concise statement of the things that make for success in his work:

"Improvements that have been made and are anticipated depend for their success largely upon local coöperation and enthusiasm. The local leaders and officials in any camp can influence social conditions for good or bad as they desire,

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NOTE—A paper read before the Lake Superior Mining Institute, summer meeting, 1909.

hence the necessity for cordial coöperation of all company officials as well as employees in the work of this department. If all unite in an uplift movement, welfare work is simple, but if indifference, or worse, no desire to improve exists, their social betterment is not only discouraging but impossible. People who help themselves will always be helped. This cannot be too strongly impressed upon any community."

The sociological side of the industry presents to us the following important matters for consideration among the great variety incident to different conditions and concerning which our time will permit of only the briefest mention.

Our Foreign Population

The foreign non-English-speaking population of our mining communities is rapidly increasing. The question of assimilating these large additions is of vital moment. As we accept them as our employees, we must in some measure accept a degree of responsibility for them. From figures prepared by Dr. Peter Roberts we obtain the following data:

The upper peninsula of Michigan comprises about 25 per cent. of the land area of the State and 11 per cent. of the male white population. This population is composed as follows: Native born of native parentage, 12.3 per cent.; native born of foreign parentage, 40.5; foreign born, 47.2.

Of the total white population of foreign parentage in the State the lower peninsula has 53.7 per cent., the upper peninsula, 46.3 per cent. The upper peninsula contains 11.5 per cent. of the total male white population, but it has 46.3 per cent. of the total male white population having foreign parentage. As Doctor Roberts says, the foreign problem in the State concerns the upper peninsula more than any other part of the commonwealth, and if Michigan is to do its part in solving this problem, it will largely be accomplished in that part of the State and by the people residing there.

The problem in Michigan has its counterpart in Wisconsin and Minnesota as in all other mining States. Have we not a duty in this work and toward these people? It would seem that we must of necessity for self-preservation if not for motives of friendly interest do all that we can to bring to these people the teachings of our Government, regard for law and order and a spirit of respect for our institutions. It is becoming more and more a problem, and it is only by the most careful study and experiment that it can be properly met. As Doctor Roberts says, "It is not likely that the State as a whole will give this matter the attention it deserves. The way must first be blazed by private enterprise."

Education Is Important

One of the first things undoubtedly is the matter of education. The mining companies have always stood for good schools and been generous in the question of taxation for school purposes, and the amount of money expended for buildings, equipment and salaries. We too often are perfectly willing to let it go at that and think we have no further consideration or responsibility. We should at least keep in touch with our school system and see that the work is such as is demanded in the localities where we reside, and while the course of study should be as uniform as possible in the State (and the superintendent of public instruction is in the best possible position to study the requirements and plan for methods and courses of study that will give the best results), we should watch the work so zealously that fine-spun theories may not be carried out at the expense of the practical education of our students. Fifty per cent. of the boys in our schools drop out before they are 16 years old and it is necessary that the school work up to that age be the best possible for their use. We should see that the attention given to the higher grades in our public schools should not detract from the value of the work done in the lower grades in which the majority of our boys receive all the education given them by the public schools; and that the school teachings be so presented that our young men may consider it worth while to look for their future work in our mines.

Civic Activities

In addition to the matter of education of the children, the social life of the community has a great deal to do in establishing the kind of citizenship to which these men look forward. The mining companies should take active interest in community problems and lend their aid to plans for the betterment of conditions. There are various agencies that can be called upon to assist in such work. Club houses such as have been erected for the men at Pulatka by the Pickands, Mather Company, and at Mountain Iron by the Oliver Iron Mining Company, are of great value. They give a meeting place for the men with bowling alleys, billiard and pool tables, smoking rooms, game rooms, baths, places for club meetings, musical and other entertainments, dances and social gatherings of all kinds.

Clubs and Social Organizations

Clubs established by the men have been productive of much good. Such organizations as the Oliver Club and the Cleveland-Cliffs Club, both in Ishpeming, are sure to be a benefit to any business. These clubs have bowling alleys, billiard or pool tables and recreation rooms. A monthly meeting is held, usually with supper, for the discussion of topics of interest, addresses by outside speakers or entertainments for the members. These clubs usually have an outing during the summer. Mining clubs have also been organized, which have for their membership the mining captains, shift bosses, timber bosses, the superintendents and the heads of the departments, either as active or honorary members. Monthly meetings are held from October to June at which addresses of interest are given, often with the aid of the stereopticon. Lunch or supper is served and topics relating to the mining work discussed. The superintendents also have a club, meeting from time to time, at which the problems of mining are discussed, committees of investigation appointed and their recommendations acted upon at these meetings are put in force. These club meetings are beneficial not only in the introduction of new plans and methods, but also in the social fellowship promoted among the members.

Young Men's Christian Association

Taking everything into consideration there is probably no agency better fitted for handling the work in connection with the men at our mining locations than the Young Men's Christian Association. The Pennsylvania Railroad Company has approved of the Y. M. C. A. as an established policy of the company, and is contributing to the support of over 35 associations on the lines of its road in addition to having provided the majority of the buildings. The following statement referred to in an address by Max Riebernack, comptroller of the Pennsylvania Railroad Company, shows the estimate put upon it by the officers of the company in connection with their railroad work.

President Cassatt recently said: "I am in full sympathy and accord with the work which is being so successfully carried on by the Young Men's Christian Association. I am satisfied that excellent results, from the standpoint of the employees as well as of the company, are being accomplished through this agency."

In the anthracite and bituminous regions of Pennsylvania, great progress has been made in Y. M. C. A. work. About 30 buildings in this region, many of them in small locations, are now in use. From these buildings workers reach other camps where buildings are not yet located and the plans are thus extended. Mining institute meetings are held each year in the different buildings and a variety of topics pertaining to all features of mining are discussed by the best posted engineers and mining men, not only from that section, but elsewhere.

In the Lake Superior District

Through the generosity of the Cleveland-Cliffs Iron Company, the Oliver Iron Company and Lake Angeline Company in assisting the local people, a Y. M. C. A. has been etsablished in Ishpeming. This building is thoroughly equipped for the use of the men, with bowling alleys, swimming pool, shower baths, locker room, reading room and li-

brary, gymnasium and lecture room, and one floor for dormitory rooms for members. The building was opened June 1, and the work during the coming season will include clubs of all kinds for every group of men who may wish to study or pursue some plan of recreation or mutual benefit. Entertainments and lectures will be given and the building will be used for social activities of every description. Educational classes of various kinds will be conducted, giving non-English speaking men a chance to first learn our language and become acquainted with the standards of our citizenship and become a part of our city life under the best conditions. It has always been found that the men are anxious to avail themselves of every opportunity of bettering themselves and their condition, and that they will spend much effort in this direction. All such agencies should be systematically encouraged. If the broad Y. M. C. A. plans should be introduced in all of the various mining localities, even with buildings with small accommodations, much might be done in solving the problem of how to assimilate the large numbers of men coming to our communities not acquainted with our customs, habits of living and ideals of government. I cannot too highly commend to the members of the Lake Superior Mining Institute the value of the Y. M. C. A. in its effect on local affairs and conditions.

The Cleveland-Cliffs Iron Company has begun the erection of a building for Y. M. C. A. and club purposes at its new mining town at Gwinn. In addition to the features usually planned for in the various clubs and Y. M. C. A's., careful attention will be given in the matter of neighborhood clubs for various groups of women and educational and entertaining features for them and for the boys and girls of the community. This building will be the recreation center for the town and be the leading factor in all social and educational development and improvement activities. The mining companies can, I believe, well afford to contribute largely to such efforts. Individual initiative should be encouraged in this work, the company through its different men supplementing and assisting in the direction and execution of the plans.

Sanitary Conditions and Medical Service

The sanitary conditions of the mines demand a most careful consideration. It was only a few years ago that any old place was sufficiently good for the men to change to their mine clothing, and for their clothing for street wear to be taken care of while they were underground. Every facility has now been given to provide the men with the best accommodations in change houses or drys. No one would think of building a dry without the best of washing facilities, with hot and cold water, shower baths, lockers for the care of the clothing, and a good system of ventilation. In the use of toilets in many cases some education is necessary, but anything that can be done to improve the sanitary conditions underground is of value to the men and in actual production through the possibility of securing the best of labor.

The health of the community is of the most vital consideration. The greater number of our mining locations are well provided with physicians the peers of any in their education, ability and character of professional service. There is no large mining town or city but what has its hospital with suitable equipment. The kind of buildings more recently erected, such as that at Coleraine, Ironwood and Gwinn indicate the consideration of the importance of providing the best of facilities for the handling of those cases which are the results of the hazard of the business. The payment of $1 per month by the men employed should guarantee suitable equipment, competent physicians, efficient nurses and good medicine. The hospitals that have inefficient men, lack of proper nursing or a greater regard for the income received than the service rendered, are few, but when found cannot be too severely condemned.

Visiting Nurse

For over a year the Cleveland-Cliffs Iron Company has employed a visiting nurse for the benefit of the families of all employees. The nurse works under the direction of the physicians of the hospital, visiting and assisting in families to whom her services can be of benefit. This work is not given as a charity, but as the means of assistance in cases not only of serious need, but in advice and usefulness in the home as occasion might require.

She has often been of material assistance in cases of emergency before a regular nurse could be obtained. She is not doing the work of the physicians, but is supplementing their efforts, seeing that their directions are carried out and families instructed in the care of the sick as well as in the general subject of the improvement of hygienic conditions. She can actually demonstrate how the work should be done. The saving of a child's life in several cases and the restoring to the active life of a family of the wife and mother who had been in bed eight months with every probability of remaining so as long as she lived, not to mention various other cases in which valuable assistance as well as sympathy have been given, are sufficient to repay the company many times for the cost of this work. I would consider that of the various features coming under my attention, in this improvement work that of the visiting nurse shows the greatest direct benefit and value.

Rest Cottage a Great Boon

In her work the nurse has found the mothers in many homes who, through the work occasioned by large families and household cares, have never had an opportunity for rest or recreation. A comfortable house was secured during the last two seasons and many mothers taken for an outing from one to two weeks. Sometimes they went alone and at others taking the younger child or baby of the family with them. Meals were provided for them so that they had no work to do other than they might wish to occupy themselves with and many a mother has gone back to her family refreshed in body and in spirit. The cost is not very heavy, but the benefits are large and the women have been glad to take advantage of this opportunity of securing a little relaxation from the monotony of their daily lives. In a number of instances it has really been the first vacation that has ever come into the life of the mother of a large family. It has in some cases warded off approaching sickness occasioned by over strain in household cares.

Prevention of Accidents

It is so well known that the mining industry is one of danger that we consider too little the accidents occuring so frequently in all mines. These accidents should demand a most careful study, not only for the reduction in economic loss and the added cost of production, but the effect upon the men employed. We must recognize that mining is a dangerous occupation, and accidents will occur and cannot always be avoided, but it should be a part of the duty of the companies to study the causes and results of these accidents carefully in each case in order to provide such remedies as may be possible. In looking over the equipment and machinery of the present day and comparing it with 25 years ago, it will be seen that additional care is being exercised, this care being of great value to the men as well as to the company economically. We see improved devices for hoisting and lowering the men with various appliances to guard against accident. We find automatic closing gates at shaft openings and a better and uniform system of signals. We find our mines better ventilated and with better methods of fire protection. The mine surroundings from being a scrap heap have become an orderly place of work with supplies properly stored.

Special commendation should be given to the Steel Corporation for the study it has given to promote the safety of its employees. The full description of these plans given in the *Iron Trade Review* of July 22, 1909, clearly illustrates the value to be derived from a careful consideration of the cause and remedy of accidents, both as it affects the men and from an economical standpoint.

In the coal-mining regions of Pennsylvania much attention has been paid to the first aid to the injured. Regular courses of study have been pursued and men instructed in their duties in times of acci-

dents and injury to the men. Exhibitions have been given and contests held showing the proficiency attained in this work. Our different mines can well afford to promote some definite plan for first aid and provide proper equipment and facilities.

Benefit Funds

Practically all the mining companies in our section contribute equally with the men to the benefit funds from which the men receive a monthly payment up to one year in case of injury, and in the event of a fatal accident sums from $200 to $500 are paid to the family or administrator. In Ishpeming alone in 1908 there was paid the sum of $10,158.58 for accident and death benefits. It is of the greatest value to the men to be assured of some degree of care or assistance during periods of injury, and the administration of these funds can well be studied to see if further improvement in benefits and assistance cannot be made.

In this connection I would mention the administration of the Carnegie fund through the Steel Corporation which has been of very great helpfulness in the many localities in which its operations are conducted and which is so well known as to need no extended description.

In the matter of benefit payments, in case of injury there has been no great degree of uniformity in the practice of the different companies. It must come more and more to be recognized that these injuries are a hazard of the business, and that the business should stand the reasonable cost of such, and every one on the same basis, in which event it would not be a hardship to any or carry suggestion of unfair comparisons.

Pension Systems

As a further aid to the men and to their families, pension systems such as have been established by the Calumet & Hecla Mining Company and the Cleveland-Cliffs Iron Company are of great benefit. A man who has worked for a very long period of years, devoting, in many cases, the best of his life to the service of the company, can well have such services recognized by some payment during his declining years. After a careful study of the pension systems in use in Europe and by various companies in the United States, the Cleveland-Cliffs Iron Company adopted a pension system, taking effect Jan. 1, 1909. In the inauguration of the system the board of directors made the following statement:

"The object of this system is to recognize the value of long continued and faithful service, and in some measure to provide for those whose years of activity have been expended in the service of the company and who through age, injury or infirmity have become incapacitated for further labor in connection with our work." The system provided that any employee who has attained the age of 65 years or more and been in the employ of the company for 25 years, may on his own request be retired and pensioned. Any employee who has worked for the company for 25 years and is 60 years of age may be retired by the pension board if in their opinion his injury or infirmity may make it desirable to assist him in this way. This pension does not prevent them from securing any other employment which is not prejudicial to the interests of the company, and of which their condition will permit. The monthly allowance of payment is on the following basis, and is continued through the life of the beneficiary:

For each year of service 1 per cent. of the average monthly pay for the 10 years next preceding retirement is to be paid to them monthly. The minimum pension to be paid is $15 per month, so that in case the amount computed upon the above plan should be less than $15, this monthly payment is increased up to the minimum amount as stated. As a further means of benefit to the men and guarantee to them that their families are not to suffer privation from loss occasioned by their death, the pension system provides certain payments to the widows and orphans. To the widow of a man accidentally killed at work a pension of $12 per month is paid for a period of five years, and for each child under the age of 16 years $1 per month additional. In case the children are all under the age of 10 years when the accidental death occurs, payments may be continued longer than five years, or until such time as the widow remarries, or the family through the aid of the mother or assistance of the children become self-supporting. The object of this is to provide the family with some assistance up to the time that the members become of such age as to render further support unnecessary. This payment, in addition to the amount received through the benefit fund in case of death, is usually sufficient to provide the family with some degree of comfort and insure against serious hardships.

The company is sure that these payments are of great benefit, and while not lessening a man's disposition to provide for his family, leads him to feel that the dangers incident to mining are not such as to make his family entirely dependent upon charity in case of his accidental death. These benefits are to be paid for the care of those needing them and are not liable to attachment, levy or seizure under any process whatever.

Improved Surroundings

The mining companies can do much to promote the sanitary conditions of the town. A proper regard for the surroundings of the mines, a prompt disposal of waste and coöperation with the health auhtorities will serve to lead the people into like habits. The character of the home and the home surroundings has a great effect upon the life of the people and the efforts in this connection are to be much commended. At Ishpeming for 15 years the prizes offered by one of the mining companies for best kept premises, vegetable gardens, vine planting, etc., have been of the greatest value in producing a mining city of which the character of the homes cannot be surpassed.

We say that the men make the character of the town in which they live. We are also convinced that the character of the town in which a man lives has a great deal to do in molding him. There is no question about the value of building towns in such a way as at Coleraine, Minn., Gary, Ind., and the new town at Gwinn, Mich., in which features of benefit to its citizens have been carefully considered. At Gwinn, the town has been laid out under the direction of Warren H. Manning, the eminent landscape designer, who has provided for the retaining of all the natural beauties that were possible. The land was cleared under the directions of Mr. Manning and his engineers so that all trees of value should be saved, and all roads and streets located and graded under his supervision. First of all a waterworks system was put in and at the same time a complete system of sewers, so that these were available previous to the erection and occupation of the houses. As result of this plan of work, the three years of town building has continued without a single case of typhoid fever, which is usually so very prevalent in new towns. Coincident with the building of the town, a hospital was established for which benefit and medical services the men pay the $1 per month customary at all the mining locations. Houses have been built and sold on reasonable terms and long time payments.

Problems Should Be Studied

It is essential to the greatest success that a proper amount of time be given to the study of the different problems and this can best be done by a suitable organization such as has been effected in the Colorado Fuel and Iron Company, and introduced by William G. Mather as a part of the work of the Cleveland-Cliffs Iron Company. This organization serves as a clearing house for problems of a sociological character that may arise in connection with the business.

There should be no thought of paternalism in the effort to surround the men with such environments as to make for their best welfare, but they should be encouraged to do what they can for their own improvement and benefit, the companies lending their help, coöperation and assistance so far as practicable. I know of no one question connected with the mining industry that will pay better from every standpoint than the study of the sociological conditions.

Ore Dressing in the United States and Mexico—I

Individual Stamps and Increased Weight in Stamp Mills; Tendency Is toward All-slime Plants. Practice in Concentrating Plants Compared

BY H. A. GUESS*

I have attempted, in so far as seemed possible within the limits of this paper, to give an outline of the principal processes of ore treatment, other than smelting, now employed in this country and in Mexico. For convenient reference these may be grouped as follows:

(1.) *Amalgamation Group*—
- Amalgamation without subsequent treatment.
- Amalgamation followed by concentration, but not cyaniding.
- Amalgamation followed by cyaniding or by concentration and cyaniding.

(2.) *Cyaniding Group*—
- Cyaniding without concentration.
- Cyaniding preceded by concentration.

(3.) *Water Concentration Group*—
- One product.
- Two or more products.
- Two or more products with subsequent separation of the more complex products.

(4.) *Miscellaneous Processes.*

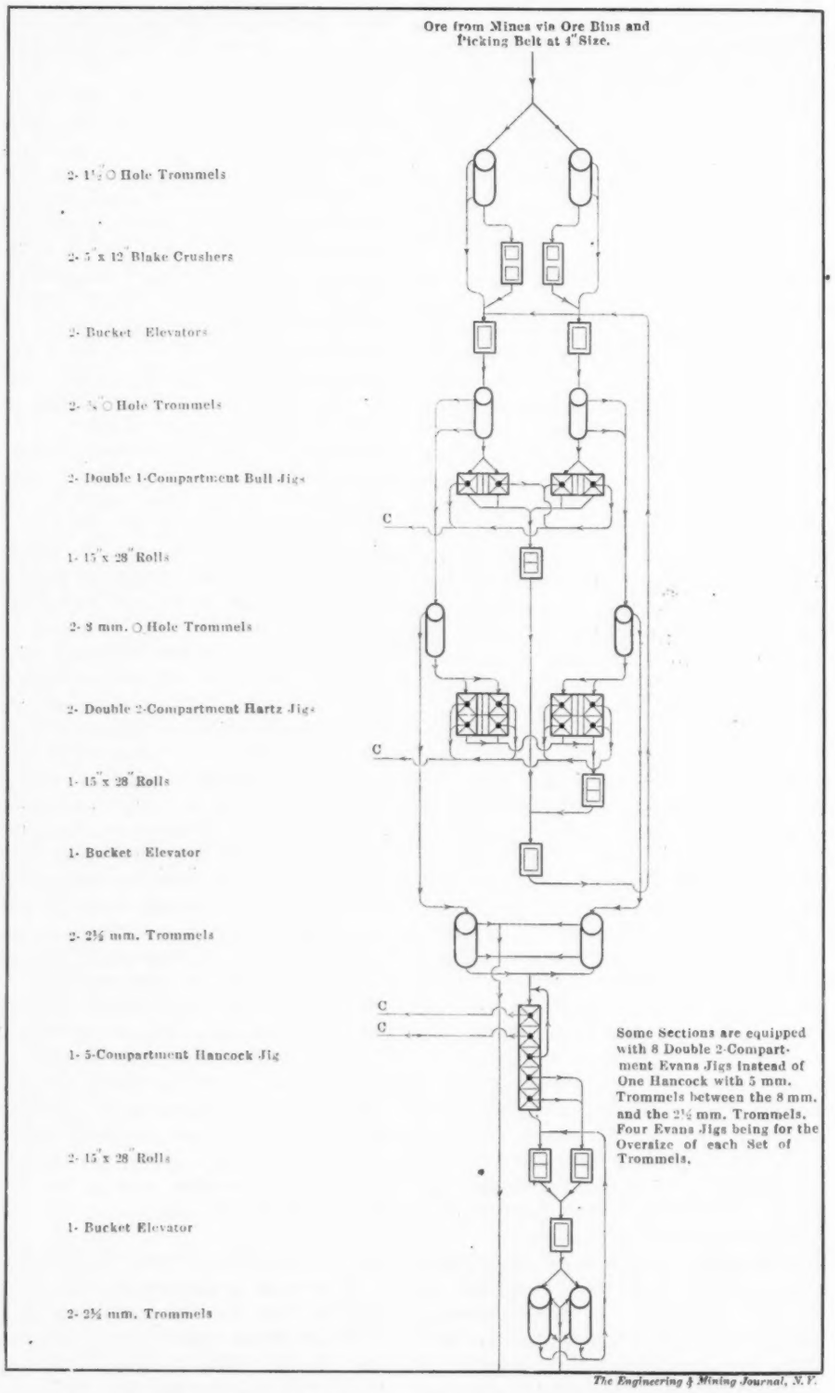
Amalgamation Group

Occasionally gold-quartz ores of workable grade are found, tailings of which, after amalgamation, do not have sufficient value to warrant either cyaniding or concentration of the sulphides. Such conditions are infrequent, however, and usually only temporary.

In general, nowadays, the tailings from amalgamation are given subsequent treatment over stratifying tables, vanners or canvas or all these for the recovery of sulphides, the sulphides being either shipped to the smeltery, roasted and chlorinated, or finely ground and cyanided. Where the tailings, even after careful concentration, carry sufficient gold or silver to warrant further treatment, cyaniding is usually found applicable as a supplementary process.

Frequently where cyaniding has been employed as an adjunct in this way to an amalgamation concentrating process, it is in time found profitable to discontinue amalgamation and run as a straight concentrating cyaniding process, with crushing in KCN solution. The decision as to this practice will depend on the amount of amalgamable gold and to what extent the advantage of catching part of the gold early in the treatment, possibly with a slightly higher total recovery, offsets the added expense of amalgamation, coupled with the necessity of subsequent pulp thickening before adding KCN solution, and of wasting larger volumes of weak KCN solution than when crushing in solution.

The Dos Estrellos mill at El Oro,

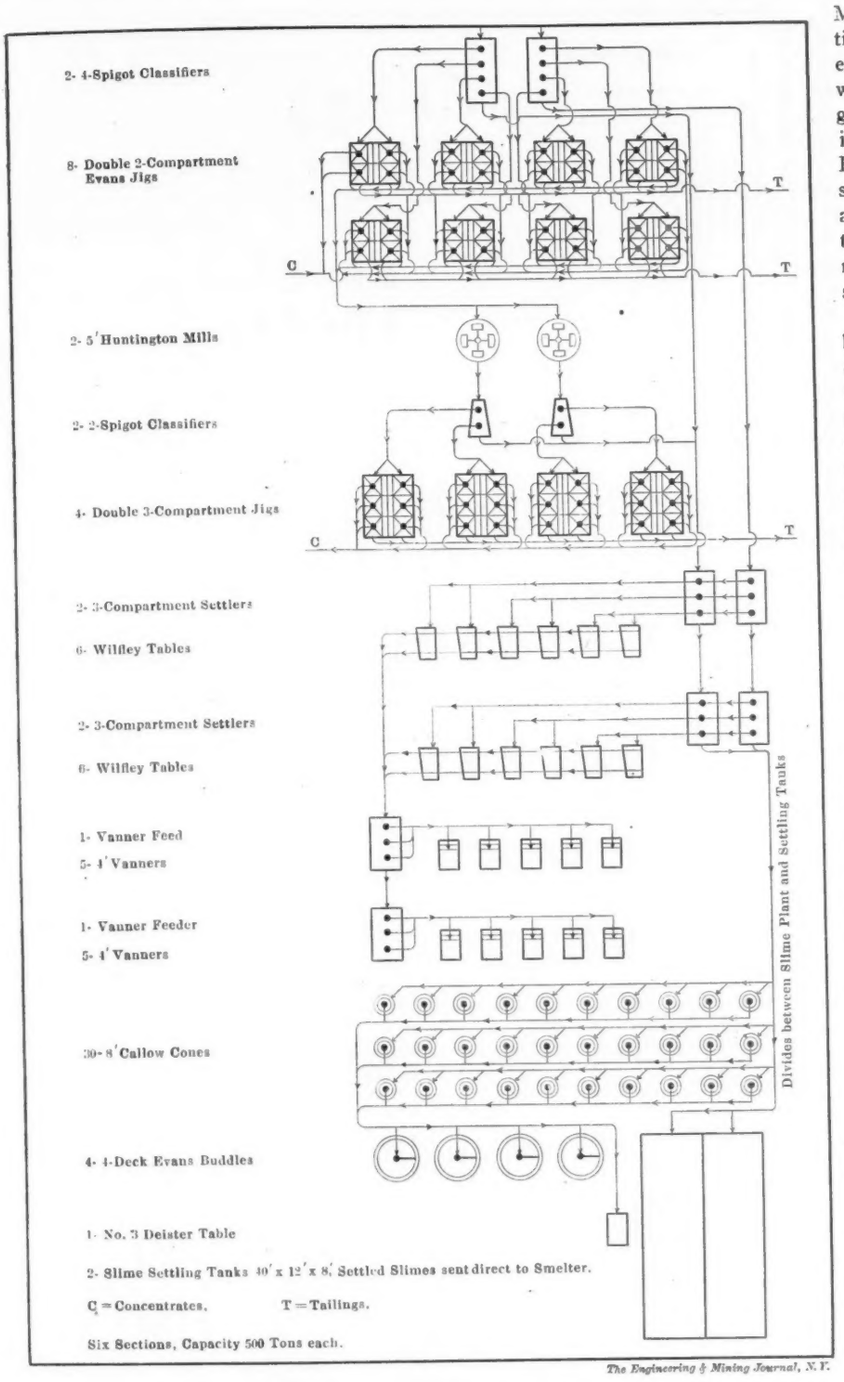

Ore from Mines via Ore Bins and Picking Belt at 4" Size.
2- 1½" ○ Hole Trommels
2- 5" x 12" Blake Crushers
2- Bucket Elevators
2- ⅜" ○ Hole Trommels
2- Double 1-Compartment Bull Jigs
C
1- 15" x 28" Rolls
2- 8 mm. ○ Hole Trommels
2- Double 2-Compartment Hartz Jigs
C
1- 15" x 28" Rolls
1- Bucket Elevator
2- 2½ mm. Trommels
C
C
1- 5-Compartment Hancock Jig
2- 15" x 28" Rolls
1- Bucket Elevator
2- 2½ mm. Trommels
Some Sections are equipped with 8 Double 2-Compartment Evans Jigs instead of One Hancock with 5 mm. Trommels between the 8 mm. and the 2½ mm. Trommels. Four Evans Jigs being for the Oversize of each Set of Trommels.
The Engineering & Mining Journal, N.Y.

FLOW SHEET OF BOSTON & MONTANA CONCENTRATOR AT GREAT FALLS, MONT.

(Continued on next page)

*Manager, Federal Lead Company, Flat River, Mo.

NOTE—Paper read before the Colorado Scientific Society.



FLOW SHEET OF BOSTON & MONTANA CONCENTRATOR—Concluded

TREATMENT DATA OF GREAT FALLS CONCENTRATOR OF BOSTON & MONTANA CO.

District—Butte, Montana.
Ore—Mixed copper sulphides and pyrite in silicious and aluminous gangue.
Treatment—Concentration begins at approximately 1½-in. maximum size.

Product	Dry Wt. % of Total	Average								Percentage Recovery		
		Au Oz. Per Ton	Ag Oz. Per Ton	Cu %	Fe %	S %	CaO %	Al_2O_3 %	SiO_2 %	Au	Ag	Cu
Crude Ore Feed	100	0.007	1.18	3.40	10.4	12.7	0.1	11.5	56.5			
Coarse Concentrates	11.1	0.019	3.28	10.03	24.2	30.9	0.1	4.8	26.7	94.8	82.1	83.1
Fine Concentrates	21.9	0.021	2.69	7.56	29.8	36.8	0.1	4.8	18.0			
Slime Concentrates	2.2	0.004	0.88	2.31	2.8	3.6	0.2	22.5	58.4			
General Tailings		0.002	0.23	0.66	1.8	1.7	0.1	12.4	77.7			

Mex., is an illustration of this transition in treatment methods, in that it started as a pan-amalgamation mill, then worked as a cyaniding plant with amalgamation discontinued, and later crushing in KCN solution was adopted. At the Homestake on the other hand, where, some years ago, cyaniding was added as a supplement to the simple amalgamation treatment, it still serves only as a supplement, amalgamation being practiced the same as previously.

One of the best examples of the combined amalgamation-concentration-cyanidation system of treatment is probably found in the recently constructed mill of the Goldfield Consolidated Mines Company, amalgamation being carried out at this plant both on the battery discharge and on the reground sands after passing through tube mills, with subsequent concentration of all slime over No. 3 Deister tables before de-watering and addition of cyanide solution.

Amalgamation Equipment

Neglecting for the present the cyaniding feature, which will be considered more in detail under the cyaniding group, the equipment of mills coming under the amalgamation group presents much sameness. The initial crushing machinery may vary a little and be either gyratory or some of the various jaw crushers of the Blake type, but almost invariably the subsequent crushing is done by stamps.

The tendency is in general toward heavier stamps, but outside of this and such lesser features as individual stamp guides, concrete mortar blocks, etc., there have been no important changes in the design of stamp batteries in recent years. An exception to this statement is found in the Nissen stamp, with its circular individual mortar, but this has so far found its best application in crushing finely disseminated concentrating ores and will be considered under the concentration group.

For concentration after amalgamation, hydraulic or surface classifiers are usually used, one or more sizes made from the sands for concentration over stratifying tables, and the slime thickened and sent to vanners, or some of the various slimers now manufactured. Sometimes, particularly in California, mechanical concentrators are not used on the tailings after amalgamation, but the total tailings are sent over canvas tables of varying slope with intermittent washing off of the concentrates.

Cyaniding Group

The cyaniding ores of the United States, as so far treated, with a few notable exceptions, have been largely gold, the silver being of lesser value; as a consequence a large number of the milling plants come under the amalgamation-cyanidation class of treatment, instead of the straight cyaniding here considered.

MACE NO. 2, MILL OF THE FEDERAL MINING AND SMELTING COMPANY.

District—Cœur d'Alene, Idaho.
Ore—Silver-bearing galena in a silicious and feldspathic gangue with siderite.
Treatment—As per accompanying flow sheet, concentration beginning at approximately 1¼-inch maximum size.
Results—As per subjoined tabulation.

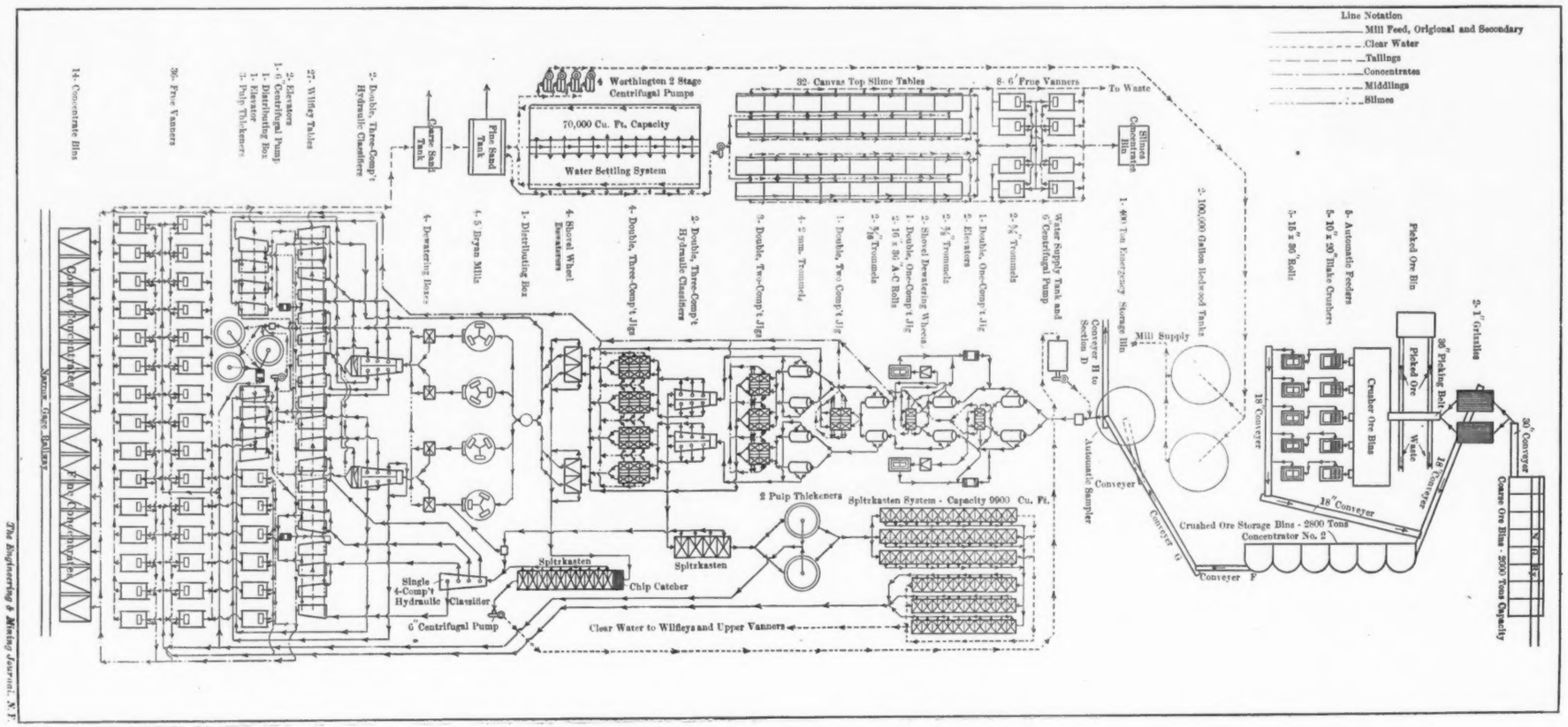
Product	Dry Wt. % of Total	Average						Percentage Recovery	
		Ag Oz. Per Ton	Pb % (Wet)	Zn. %	Fe %	S %	Insol. %	Ag	Pb (Wet)
Crude Ore	100.0	6.3	8.0	3.0	15.2	6.1	57.1	.....	.....
General Concentrates*	13.8	39.6	50.5	.....	.....	.....	.....	79.8	80.2
Coarse Tailings	.....	0.8	1.1	.....	.....	.....	.....	.....	.....
Slime Tailings	.....	2.2	2.5	.....	.....	.....	.....	.....	.....

*Contains 21 per cent. vanner and other slime concentrates.

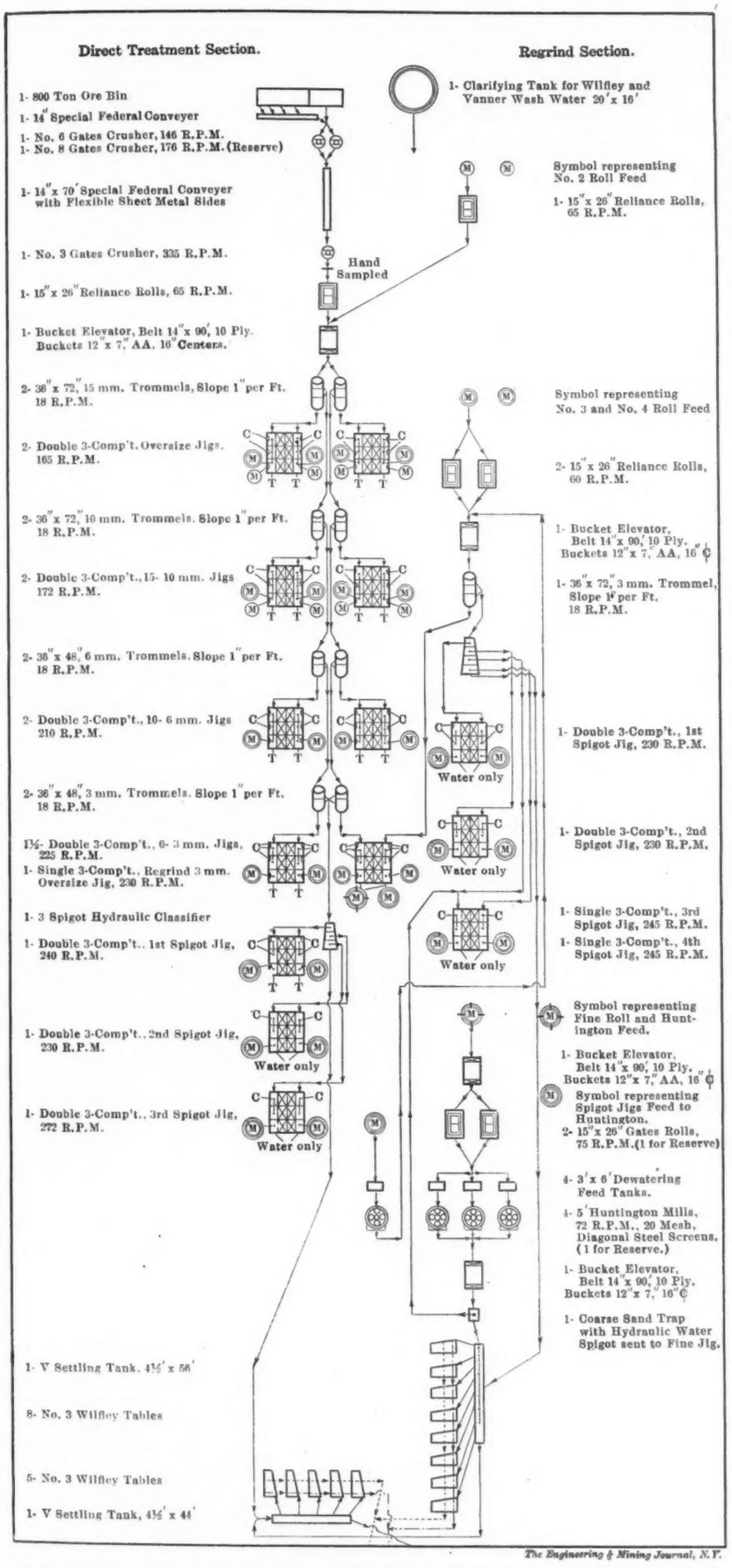
PRODUCTS OF THE GREENE-CANANEA CONCENTRATOR

District—Sonora, Mexico.
Ore—Pyrite with chalcocite and some bornite and chalcopyrite in a silicious porphyry gangue with some garnet.
Treatment—As per accompanying flow sheet, concentration beginning at approximately ⅜-inch maximum size.
Results—As per subjoined tabulation, the ore varying more or less in different years and these results being typical, rather than definite period averages.

Product	Dry Wt. % of Total	Average						Percentage Recovery
		Cu %	Fe %	S %	CaO %	Al_2O_3 %	SiO_2 %	Cu
Crude Ore Feed	100.0	2.7	13.2	13.0	1.6	10.0	54.5	....
General Concentrates	31.2	6.0	31.0	31.8	1.0	3.5	15.4	70.5
Coarse Tailings	0.9	.....	.....	.....	.....	.....	.....	....
Slime Tailings	.....	1.6	1.4	1.7	1.7	22.8	57.2	....



FLOW SHEET OF 750-TON SECTION OF CONCENTRATOR NO. 2 OF THE GREENE-CANANEA COPPER COMPANY


Direct Treatment Section.
Regrind Section.
1- 800 Ton Ore Bin
1- 14" Special Federal Conveyer
1- No. 6 Gates Crusher, 146 R.P.M.
1- No. 8 Gates Crusher, 176 R.P.M. (Reserve)
1- 14" x 70' Special Federal Conveyer with Flexible Sheet Metal Sides
1- No. 3 Gates Crusher, 335 R.P.M.
1- 15" x 26" Reliance Rolls, 65 R.P.M.
1- Bucket Elevator, Belt 14" x 90', 10 Ply. Buckets 12" x 7", AA, 16" Centers.
2- 36" x 72", 15 mm. Trommels, Slope 1" per Ft. 18 R.P.M.
2- Double 3-Comp't. Oversize Jigs. 165 R.P.M.
2- 36" x 72", 10 mm. Trommels. Slope 1" per Ft. 18 R.P.M.
2- Double 3-Comp't., 15- 10 mm. Jigs 172 R.P.M.
2- 36" x 48", 6 mm. Trommels. Slope 1" per Ft. 18 R.P.M.
2- Double 3-Comp't., 10- 6 mm. Jigs 210 R.P.M.
2- 36" x 48", 3 mm. Trommels. Slope 1" per Ft. 18 R.P.M.
1½- Double 3-Comp't., 6- 3 mm. Jigs, 225 R.P.M.
1- Single 3-Comp't., Regrind 3 mm. Oversize Jig, 230 R.P.M.
1- 3 Spigot Hydraulic Classifier
1- Double 3-Comp't., 1st Spigot Jig, 240 R.P.M.
1- Double 3-Comp't., 2nd Spigot Jig, 230 R.P.M.
1- Double 3-Comp't., 3rd Spigot Jig, 272 R.P.M.
Water only
Hand Sampled
1- Clarifying Tank for Wilfley and Vanner Wash Water 20' x 16'
Symbol representing No. 2 Roll Feed
1- 15" x 26" Reliance Rolls, 65 R.P.M.
Symbol representing No. 3 and No. 4 Roll Feed
2- 15" x 26" Reliance Rolls, 60 R.P.M.
1- Bucket Elevator, Belt 14" x 90', 10 Ply. Buckets 12" x 7", AA, 16" ¢
1- 36" x 72", 3 mm. Trommel, Slope 1" per Ft. 18 R.P.M.
1- Double 3-Comp't., 1st Spigot Jig, 230 R.P.M.
1- Double 3-Comp't., 2nd Spigot Jig, 230 R.P.M.
1- Single 3-Comp't., 3rd Spigot Jig, 245 R.P.M.
1- Single 3-Comp't., 4th Spigot Jig, 245 R.P.M.
Symbol representing Fine Roll and Huntington Feed.
1- Bucket Elevator, Belt 14" x 90', 10 Ply, Buckets 12" x 7", AA, 16" ¢
Symbol representing Spigot Jigs Feed to Huntington.
2- 15" x 26" Gates Rolls, 75 R.P.M. (1 for Reserve)
4- 3' x 6' Dewatering Feed Tanks.
4- 5' Huntington Mills, 72 R.P.M., 20 Mesh, Diagonal Steel Screens. (1 for Reserve.)
1- Bucket Elevator, Belt 14" x 90', 10 Ply. Buckets 12" x 7", 16" ¢
1- Coarse Sand Trap with Hydraulic Water Spigot sent to Fine Jig.
1- V Settling Tank, 4½' x 56'
8- No. 3 Wilfley Tables
5- No. 3 Wilfley Tables
1- V Settling Tank, 4½' x 44'
The Engineering & Mining Journal, N.Y.

FLOW SHEET OF MACE NO. 2 MILL OF THE FEDERAL MINING AND SMELTING COMPANY, WALLACE, IDAHO—Continued.

In Mexico, on the other hand, where the ores in general contain relatively large silver values, amalgamation is rarely practiced in conjunction with cyaniding, and at most plants in Mexico crushing is now done in cyanide solution.

Until about five years ago, slime in connection with cyaniding was as undesirable as is still the case in strictly concentrating ores. About this time, however, the El Oro Mining and Railway Company began extensive experiments[1] looking to an improvement over the low extractions from leaching battery sands, and demonstrated conclusively that a large portion of the gold of these sands was silica incased, and was not released for dissolution by cyaniding until the ore was ground to approximately 150 mesh. These experiments also showed that by fine grinding, not only was the extraction increased, but the period of treatment shortened.

El Oro was the pioneer on this continent in the use of tube mills on an extensive scale for fine grinding in connection with the cyaniding process, and from the success at this camp with gold-silver ores, the cyaniding of more distinctively silver ores was developed at Guanajuato and at Pachuca.

Higher extractions can be made on a given ore in the condition of slime than as sand, and for this reason wherever the gold-silver values of the ore justify the extra expense, cost of power, etc., duly considered, not only finer grinding, but all sliming is usually adopted as the process giving maximum profit.

This is the process at most of the plants of El Oro and Pachuca; it is also the process contemplated for a large plant now being figured on at Guanajuato. In the United States, the Montana-Tonopah and the recently constructed Goldfield Consolidated are on this all sliming basis of treatment, and at the Homestake Mining Company's large plants treating both sand and slimes, regrinding of the coarser of the sands now being leached, has been decided upon, necessitating additions to the slime plant.

In the matter of concentration before cyaniding, much variation in practice is found. Some plants cyanide direct without removal of sulphides, experience with their ore leading them to decide that though a slightly higher percentage recovery of the gold and silver in the concentrates might be obtained by their removal and separate treatment by smelting or cyaniding with stronger solutions, finer grinding and longer treatment, yet in commercial results it was more profitable to adopt the simpler treatment system with the slightly lower recovery of the metals in the sulphides.

Some plants, on the other hand, concentrate the battery discharge, either

[1] "The Cyaniding of Ore at El Oro," *Trans.* I. M. M., Oct., 1904. "Fine Grinding of Ore by Tube Mills and Cyaniding at El Oro, Mexico," *Trans.* A. I. M. E., Vol. 37, pp. 3-55.

ASSAY AND SCREEN TESTS OF PRODUCTS OF THE BOSTON CONSOLIDATED MINING COMPANY MILL AT GARFIELD, UTAH

District—Bingham, Utah.
Ore—Finely disseminated copper sulphides in monzonite porphyry; minerals, chalcocite, bornite, chalcopyrite, pyrite and covellite.
Treatment—As per accompanying flow sheet. Concentration begins at approximately 20-mesh maximum size.

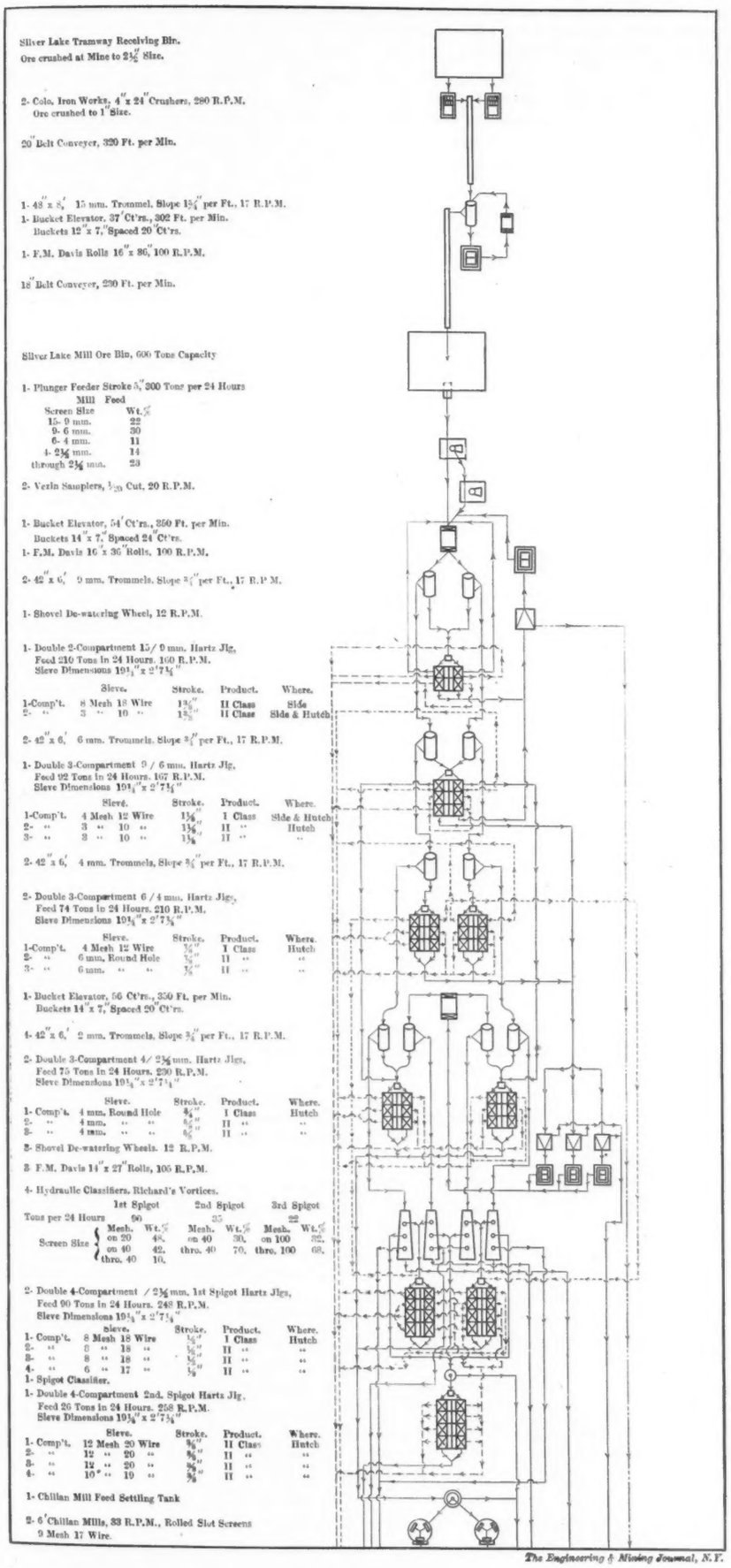
Product	Dry Wt. % of Total	Average						Percentage Recovery			Screen Tests	General Concentrates		Tailings	
		Au Oz. Per Ton	Ag Oz. Per Ton	Cu %	Fe %	S %	SiO_2 %	Cu	Au	Ag		Wt. %	Cu %	Wt. %	Cu %
Crude Ore	100.0	0.004	0.035	1.6	1.9	2.1	55.0				On 50 mesh	11	9.1	25	0.48
											On 80 mesh	22	18.0	20	0.37
											On 100 mesh	17	20.2	12	0.18
											On 150 mesh	20	24.3	9	0.26
											On 200 mesh	6	26.4	6	0.38
											Through 200 mesh	24	27.5	32	0.51
Coarse Wilfley Concentrates	3.4	0.07	0.55	17.9	31.2	34.8	15.1				Totals and Averages	100	21.4	100	0.41
Fine Wilfley Concentrates	0.8	0.07	0.70	27.8	17.6	26.6	26.9								
Vanner Concentrates	1.4	0.08	0.70	25.1	18.0	23.6	32.3	74							
Total General Concentrates	5.6	0.07	0.60	21.2	25.8	30.8	21.20								
Coarse Tailings	60.0			0.4	0.40										
Slime Tailings	34.0			0.5	0.63										

Crude ore too low for precise Au-Ag determination.

1- 2' x 4' Clarifying Box for Wilfley Tailings. Slimes Overflow to Slime Tank as shown.
1- 2'x 4' Sand Trap.
1- V Settling Tank, 3½' x 64' for Wilfley Head Slimes, Clear Water Overflow.
1- V Distributing Tank, 3' x 64' for Wilfley 1st Treatment Tailings, No Overflow.
6- No. 5 Wilfley Tables.
Note:- The Head Water of these Tables, if Slimy, can be run to Elevator for Thickening and Vanner Treatment.
6- Frue Vanners, (3- 4' and 3- 6')
1- Bucket Elevator, Belt 12" x 50', 10 Ply, Buckets 10" x 6", 16" Centers.
Final Wilfley Tailings
3- V Settling Tanks, each 3½' x 20', Clear Water Overflows.
Clear Water
Clear Water
Clear Water
Clear Water
Unfinished Wilfley or Vanner Tailings.
Slimes.
2- V Settling Tanks, each 3½' x 50'; Clear Water Overflows.
8- 6' Frue Vanners Retreating Upper Vanners Tailings.
Clear Water
Clear Water
Final Vanner Tailings
JIG SCREEN DATA
Direct Treatment
Jig Size. R.P.M Screen Mesh. Dimensions.
Oversize 165 5 mm. ○ Hole 20" x 36"
15 - 10 mm. 172 3 mm. ○ Hole 20" x 36"
10 - 6 mm. 210 6 Mesh 18 Wire 20" x 36"
6 - 3 mm. 225 8 Mesh 16 Wire 20" x 36"
1st Spigot 240 6 Mesh 18 Wire 20" x 36"
2nd Spigot 230 (1 & 2) 8 Mesh 13 Wire 20" x 36"
(3) 3 mm. ○ Hole 20" x 36"
3rd Spigot 272 (1 & 2) 10 Mesh 22 Wire 20" x 36"
(3) 3 mm. ○ Hole 24" x 36"
Regrinding
Oversize 3 mm. 230 8 Mesh 18 Wire 20" x 36"
1st Spigot 230 6 Mesh 18 Wire 20" x 36"
2nd Spigot 230 (1 & 2) 8 Mesh 18 Wire 20" x 36"
(3) 3 mm. ○ Hole 24" x 36"
3rd Spigot 245 (1 & 2) 10 Mesh 22 Wire 24" x 36"
(3) 3 mm. ○ Hole 24" x 36"
4th Spigot 245 (1 & 2) 12 Mesh 22 Wire 24" x 36"
(3) 3 mm. ○ Hole 24" x 36"
Note:- Concentrate Travel is not shown.
Capacity 600 Tons per 24 Hours.
The Engineering & Mining Journal, N.Y.

FLOW SHEET OF MACE NO. 2 MILL—Concluded

FLOW SHEET OF THE BOSTON CONSOLIDATED MILL AT GARFIELD, UTAH


Silver Lake Tramway Receiving Bin.
Ore crushed at Mine to 2½" Size.
2- Colo. Iron Works, 4" x 24" Crushers, 280 R.P.M.
Ore crushed to 1" Size.
20" Belt Conveyer, 320 Ft. per Min.
1- 48" x 8', 15 mm. Trommel. Slope 1¼" per Ft., 17 R.P.M.
1- Bucket Elevator, 37 Ct'rs., 302 Ft. per Min.
Buckets 12" x 7," Spaced 20" Ct'rs.
1- F.M. Davis Rolls 16" x 36," 100 R.P.M.
18" Belt Conveyer, 220 Ft. per Min.
Silver Lake Mill Ore Bin, 600 Tons Capacity
1- Plunger Feeder Stroke 5," 300 Tons per 24 Hours
Mill Feed
Screen Size Wt.%
15- 9 mm. 22
9- 6 mm. 30
6- 4 mm. 11
4- 2½ mm. 14
through 2½ mm. 23
2- Vezin Samplers, 1/20 Cut, 20 R.P.M.
1- Bucket Elevator, 54 Ct'rs., 350 Ft. per Min.
Buckets 14" x 7," Spaced 24" Ct'rs.
1- F.M. Davis 16" x 36" Rolls, 100 R.P.M.
2- 42" x 6', 9 mm. Trommels. Slope 3/4" per Ft., 17 R.P.M.
1- Shovel De-watering Wheel, 12 R.P.M.
1- Double 2-Compartment 15/ 9 mm. Hartz Jig,
Feed 230 Tons in 24 Hours. 160 R.P.M.
Sieve Dimensions 19½" x 2'7½"
Sieve. Stroke. Product. Where.
1-Comp't. 8 Mesh 18 Wire 1⅜" II Class Side
2- " 3 " 10 " 1⅝" II Class Side & Hutch
2- 42" x 6', 6 mm. Trommels. Slope 3/4" per Ft., 17 R.P.M.
1- Double 3-Compartment 9 / 6 mm. Hartz Jig,
Feed 92 Tons in 24 Hours. 167 R.P.M.
Sieve Dimensions 19½" x 2'7½"
Sieve. Stroke. Product. Where.
1-Comp't. 4 Mesh 12 Wire 1⅛" I Class Side & Hutch
2- " 3 " 10 " 1⅜" II " Hutch
3- " 3 " 10 " 1⅛" II " "
2- 42" x 6', 4 mm. Trommels, Slope 3/4" per Ft., 17 R.P.M.
2- Double 3-Compartment 6 / 4 mm. Hartz Jigs,
Feed 74 Tons in 24 Hours. 210 R.P.M.
Sieve Dimensions 19½" x 2'7½"
Sieve. Stroke. Product. Where.
1-Comp't. 4 Mesh 12 Wire ¾" I Class Hutch
2- " 6 mm. Round Hole ⅝" II " "
3- " 6 mm. " " ⅝" II " "
1- Bucket Elevator, 56 Ct'rs., 350 Ft. per Min.
Buckets 14" x 7," Spaced 20" Ct'rs.
4- 42" x 6', 2 mm. Trommels, Slope 3/4" per Ft., 17 R.P.M.
2- Double 3-Compartment 4/ 2½ mm. Hartz Jigs,
Feed 75 Tons in 24 Hours. 230 R.P.M.
Sieve Dimensions 19½" x 2'7½"
Sieve. Stroke. Product. Where.
1- Comp't. 4 mm. Round Hole ½" I Class Hutch
2- " 4 mm. " " ½" II " "
3- " 4 mm. " " ½" II " "
3- Shovel De-watering Wheels. 12 R.P.M.
3- F.M. Davis 14" x 27" Rolls, 105 R.P.M.
4- Hydraulic Classifiers, Richard's Vortices.
1st Spigot 2nd Spigot 3rd Spigot
Tons per 24 Hours 90 35 22
Screen Size Mesh. Wt.% Mesh. Wt.% Mesh. Wt.%
on 20 48. on 40 30. on 100 32.
on 40 42. thro. 40 70. thro. 100 68.
thro. 40 10.
2- Double 4-Compartment / 2½ mm. 1st Spigot Hartz Jigs,
Feed 90 Tons in 24 Hours. 248 R.P.M.
Sieve Dimensions 19½" x 2'7½"
Sieve. Stroke. Product. Where.
1- Comp't. 8 Mesh 18 Wire ⅛" I Class Hutch
2- " 8 " 18 " ⅛" II " "
3- " 8 " 18 " ⅛" II " "
4- " 6 " 17 " ⅛" II " "
1- Spigot Classifier.
1- Double 4-Compartment 2nd. Spigot Hartz Jig,
Feed 26 Tons in 24 Hours. 258 R.P.M.
Sieve Dimensions 19½" x 2'7½"
Sieve. Stroke. Product. Where.
1- Comp't. 12 Mesh 20 Wire ⅜" II Class Hutch
2- " 12 " 20 " ⅜" II " "
3- " 12 " 20 " ⅜" II " "
4- " 10" " 19 " ⅜" II " "
1- Chilian Mill Feed Settling Tank
2- 6' Chilian Mills, 33 R.P.M., Rolled Slot Screens
9 Mesh 17 Wire.
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FLOW SHEET OF SILVER LAKE MILL NEAR SILVERTON, COLORADO—Continued

sands only, or sands and slimes, and still others, with higher-grade, more refractory sulphides, find it profitable to go into the matter still further and concentrate also the slime resulting from tube mill grinding of the concentrated battery sands.

Cyaniding Equipment

The modern cyanide plant on an all-sliming basis usually starts off with gyratory or jaw crushers, followed by stamps crushing in solution. The battery discharge is classified into slimes for further treatment and sands for regrinding, either by cones, or in the more recent plants by mechanical classifiers. The sand thus delivered is thickened for regrinding in tube mills.

The tube mills themselves are usually of the trunnion type, or trunnion bearing at the feed end, with tire on roller supports at discharge end, thus permitting a large discharge throat into which can be shoveled pebbles or mine ore for similar purpose. They use a reverse worm in feeding, coupled with a baffle plate of the Neal type in discharge. The lining is usually of the El Oro ribbed type. The usual trunnion feed has been a fixed pipe with stuffing box, but of late at many plants a smaller curved pipe has been used, which fits loosely into a round hole of larger diameter in the vertical plate covering of the feed end. Through this the feed is projected as a jet into the mill.

The final slime is then agitated, either by revolving arms in round tanks of moderate depth with or without the aid of centrifugal pumps, or more recently by tall Pachuca tanks. These latter employ a central tube for agitating by the air-lift principle. They were originally designed in New Zealand and have within the last year or two been adopted by many of the newer plants.

For filtering the treated slime, either with or without previous washing by decantation, vacuum filters, pressure filters, or filter presses are used. Of the vacuum filters the type most largely used is the Butters or Moore; of the pressure filters, the Burt; and of filter presses, the one principally used is the Merrill sluicing-discharge type. The initial and the largest Merrill filter-press installation is at Lead, S. D., where twenty-six 96-frame presses handle 1,500 tons per day of Homestake slime. This is a rather crystalline slime and enables a porous cake to be made with frames of 4 in. thickness.

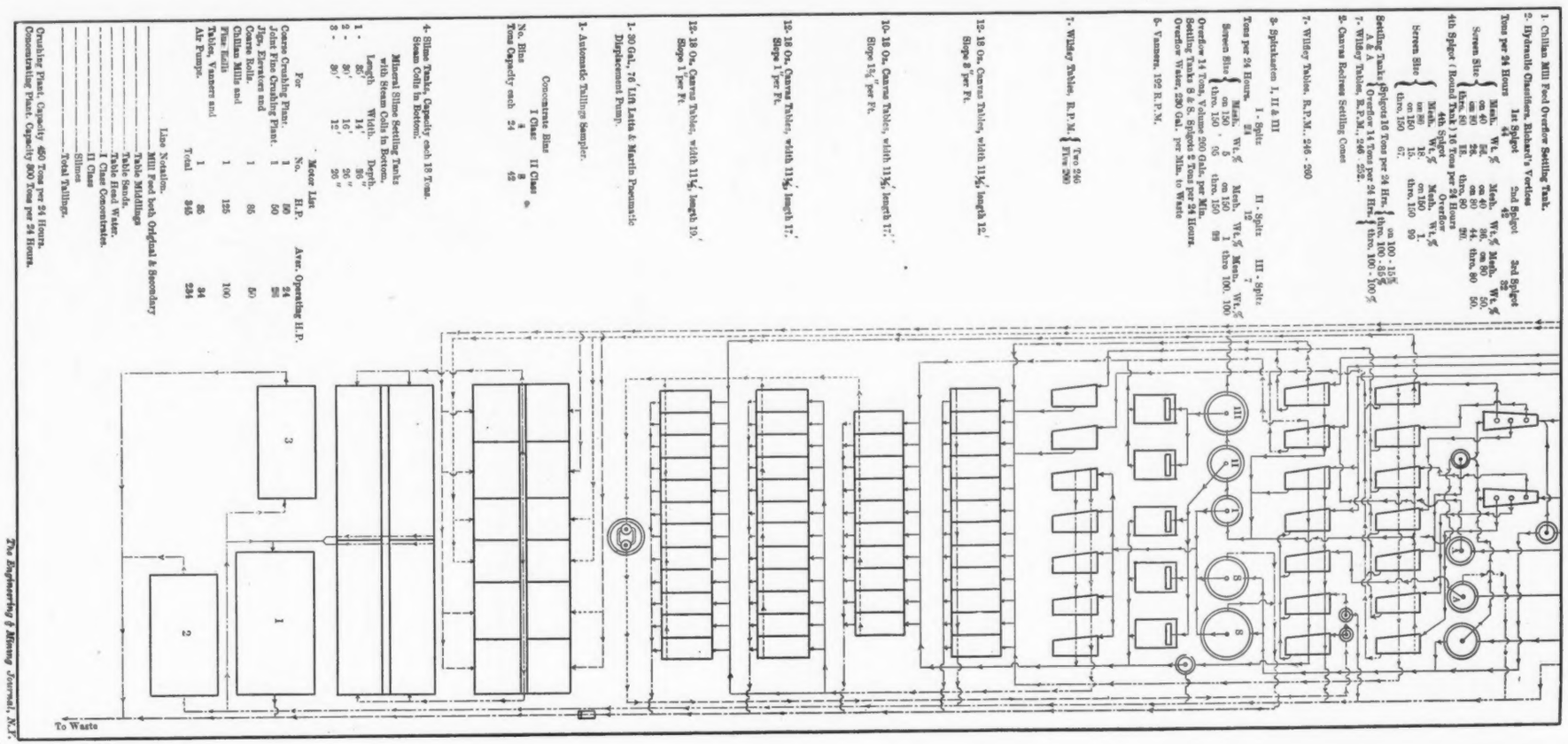
It was not thought that slime of flocculent character could be satisfactorily filtered and washed in such a press as a commercial proposition, but within the past year experiments have shown it entirely feasible to fill the frame only about 80 per cent. full, leaving a thin center parting through which washing can proceed both ways through the cake. This is the system employed at Silver Peak,

TREATMENT DATA OF THE SILVER LAKE MILL OF THE GARFIELD SMELTING COMPANY, NEAR SILVERTON, COLORADO

District—San Juan County, Colorado.
Ore—Gold and silver with more or less oxidized galena, chalcopyrite, antimonial silver, pyrite and blende in a gangue of quartz, siderite and rhodochrosite.
Treatment—As per accompanying flow sheet, concentration beginning at 15-mm. maximum size.

Product	Dry Wt. % of Total	Average: Au Oz. Per Ton	Ag Oz. Per Ton	Pb % (Wet)	Cu %	Zn %	Fe %	S %	Insol. %	Mn %	MgO %	CaO %	Percentage Recovery: Au	Ag	Pb	Cu
Crude Ore	100.0	0.14	8.0	2.28	1.53	2.70	7.6	3.7	62.8	4.8	3.9	2.0	.....	.....	.....	.....
First Class Concentrates	1.8	1.76	70.0	33.0	2.9	4.8	11.6	15.2	16.5	4.1	.....	1.4	.....	.....	.....	.....
Second Class Concentrates	14.4	0.52	22.9	6.0	6.4	8.7	16.1	14.4	24.2	9.0	.....	2.4	.....	.....	.....	.....
Slime Concentrates	5.5	0.39	22.8	7.4	2.8	4.0	11.6	8.4	43.6	5.1	.....	2.6	.....	.....	.....	.....
Totals and Averages for Concentrates	21.7	0.59	26.8	8.6	5.2	7.2	14.5	13.0	28.3	7.2	.....	2.3	91.4	72.4	81.6	74.2
General Tailings	.....	0.029	2.28	0.51	0.53	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Typical Screen Tests	Total Tailings: Wt. %	Au Oz.	Ag Oz.	Pb %	Cu %
On 150 mesh	58.2	.030	1.70	0.45	0.45
Through 150 mesh—Sands	28.2	.028	2.15	0.65	0.65
Through 150 mesh—Slimes	13.6	.030	5.15	1.10	1.10
Totals and Averages	100.0	.029	2.26	0.50	0.48


1- Chilian Mill Feed Overflow Settling Tank.
2- Hydraulic Classifiers, Richards's Vortices
Tons per 24 Hours 1st Spigot 44 2nd Spigot 22
Screen Size Mesh. Wt. % Mesh. Wt. % Mesh. Wt. %
on 40 24. on 40 26. on 80 50.
thro 40 on 80 18. thro 80 44. thro 80 50.
4th Spigot (Round Tank) 16 Tons per 24 Hours Overflow
Screen Size Mesh. Wt. % Mesh. Wt. %
on 80 16. on 150 1.
thro. 150 67. thro. 150 99
Settling Tanks Spigots 16 Tons per 24 Hrs. on 100 - 15 %
A & A Overflow 14 Tons per 24 Hrs. thro. 100 - 85 %
7- Wilfley Tables, R.P.M., 246 252. thro. 100 - 100 %
2- Canvas Rachess Settling Cones
7- Wilfley Tables, R.P.M., 246 - 260
3- Spitzkasten I, II & III
I - Spitz. II - Spitz. III - Spitz.
Tons per 24 Hours. 24 12 7
Screen Size Mesh. Wt. % Mesh. Wt. % Mesh. Wt. %
on 150 3 on 150 9 thro 100. 100
thro 150 97 thro 150 91
Overflow 14 Tons Volume 200 Gals. per Min.
Settling Tanks B & S, Spigots 8 Tons per 24 Hours.
Overflow Water, 230 Gal. per Min. to Waste
6- Vanners. 192 R. P. M.
7- Wilfley Tables, R.P.M. { Two 246 Five 260
10- 18 Oz. Canvas Tables, width 11½', length 17.' Slope 1½" per Ft.
12- 18 Oz. Canvas Tables, width 11½', length 12.' Slope 2" per Ft.
12- 18 Oz. Canvas Tables, width 11½', length 17.' Slope 1" per Ft.
12- 18 Oz. Canvas Tables, width 11½', length 10.' Slope 1" per Ft.
1- 30 Gal., 76' Lift Letts & Martin Pneumatic Displacement Pump.
1- Automatic Tailings Sampler.
Concentrate Bins I Class II Class
No. Bins 4 8
Tons Capacity each 24 48
4- Slime Tanks, Capacity each 18 Tons. Steam Coils in Bottom.
Mineral Slime Settling Tanks with Steam Coils in Bottom.
Length Width. Depth.
1 - 20' 14' 20' "
2 - 20' 16' 20' "
3 - 20' 12' 20' "
Motor List
For No. H.P. Aver. Operating H.P.
Coarse Crushing Plant. 1 50 24
Joint Fine Crushing Plant. 1 50 25
Jigs, Elevators and Coarse Rolls. 1 85 50
Chilian Mills and Fine Ends 1 125 100
Tables, Vanners and Air Pumps. 1 85 24
Total 345 224
Line Notation.
Mill Feed both Original & Secondary
Table Middlings
Table Sands.
Table Head Water.
I Class Concentrates.
II Class
Slimes
Total Tailings.
Crushing Plant, Capacity 450 Tons per 24 Hours.
Concentrating Plant, Capacity 800 Tons per 24 Hours.
To Waste
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FLOW SHEET OF SILVER LAKE MILL—Concluded.

using 3-in. frames, and will also be employed for a certain class of slime at the new Esperanza plant at El Oro. The standard 4-in. Merrill frame will be used, however, for the reground-sand slime.

For precipitation, zinc shavings is still the usual method, returning short zinc to the boxes and omitting acid treatment. Precipitation by zinc dust is, however, gaining in favor, and whenever acid treatment of the zinc-dust precipitate can be dispensed with, its use will show an economy over the shaving method both in labor and in supplies.

For the average cyaniding ores, say, of Nevada, and particularly Mexico, the amount of gold and silver present in the ore and therefore in the pregnant solution is sufficient to insure a low ratio of zinc consumption to bullion, say not over 4:1, and in such case the cakes of precipitate from the press can be melted direct without the above-mentioned acid treatment.

Water Concentration Group

In point of tonnage handled and value of product, the treatment processes of this group are in this country more important than all others combined—exclusive of smelting. All methods of water concentration are based on differences in specific gravity, and as extremely finely divided material or slime—200 mesh and finer—does not in treatment respond as readily to this difference as coarser and more granular particles, it follows as a fundamental principle in water concentration that the less the particles of minerals are crushed beyond the size necessary to effect their complete releasement from the gangue or from themselves—where two or more minerals are present requiring separation—the better is the condition of the ore for recovery by the concentrating machinery of the process.

This being the principle adhered to by all well designed, water-concentration plants, it follows that wide differences in details of treatment result, this being due to the diversity of mineralization in the concentrating ores. The accompanying flow sheets and tabulations give details of treatment and the results at a number of typical water-concentration plants, representing the various districts and ore types.

Perhaps the extremes of practice in this respect may be found in comparing, say, the Mace concentrating mills of Wallace or the Bunker Hill & Sullivan at Kellogg, Ida., separating silver-bearing galena from a silicious and feldspathic gangue, with, say, the Boston Consolidated at Garfield, Utah, separating copper and iron sulphides from a porphyry gangue.

At the former mills, after preliminary crushing with breakers and coarse rolls, concentration begins, with jigging at about 1½-in. size, and tailings are made for discard at this size. This is good metallurgical practice under the conditions and is possible because of the coarse character of the mineralization, coarse crushing liberating both coarse mineral and coarse gangue.

At the latter plant the cupriferous sulphides are finely disseminated throughout the gangue, few particles being over 1 mm. in size, and as a consequence no attempt at concentration is made until the ore has been crushed to pass a screen of 20 to 30 mesh.

(To be continued.)

Notes on the Effect of Earthquakes on Deep Underground Water Circulation

By W. H. Yeandle*

A small note stating that earthquake shocks frequently jar the mine workings in Oaxaca, which was recently published in one of our technical journals, attracted my attention. Although I have resided in Oaxaca over four years, I had never noted any effect from the frequent earthquakes. To the contrary, in November of last year I was underground in the Rosario mine at Taviche, Oaxaca, during a rather hard shake and on coming out to the surface I found the top crew excited over the extent of the movement, which according to their version was sufficient to cause the galvanized-iron roofs to rattle and the stacks to sway alarmingly. I had felt nothing and inquiry among the underground men failed to find one who had even noted the shock.

I have been told repeatedly, however, by trustworthy men that the earthquakes affected the flow of water in the mines in this state. As a result I resolved to watch for such action.

On July 25, it was decided to determine the exact amount of water entering the mine per 24 hours, and to collect data on the power required to operate the pumps; this involved an evaporative test on the boilers, during which the temperature of the mine water was taken, same being used for steam purposes. That these data should have been taken just at this time was purely accidental.

At about 4 a.m., July 29, an earthquake occurred the duration of which I estimate to have been about 45 sec. After 5 hours and 30 min. the customary second shock came: This lasted about 20 sec. Inquiry brought out that neither shock was felt underground, nor did a careful examination of the mine workings lead to the discovery of any effect that could be attributed to this cause. There can be no doubt, however, that these shocks and subsequent ones affected to a marked extent the flow of water in the mine.

*Engineer and superintendent, Mina Rosario, Ocotlan, Oaxaca, Mex.

Measurements of Flow of Water

The pumping facilities at the Rosario exceed the capacity required, and the pumps in consequence are run at stated intervals. One of these intervals is at 6 a.m. On the morning of the shock the sumps were found overflowed to a marked extent, and note was taken of the increase of the water. On the following day my attention was called, by drillmen making a practice of bathing in the settling sump, to the fact that the water seemed warmer. I then began taking the temperature of the water several times daily. The quantity of the water was found in the following instances by multiplying the plunger displacement, by strokes per minute, by time pump was run, allowance being made for irregularities in starting, so that there can be no question as to comparative accuracy of amounts of water. The accompanying table presents the results of my observations covering a period of 10 days.

FLOW DURING EARTHQUAKE PERIOD.

Date.	Rate of Flow per 24 Hours.	Increase Over Normal.	
July 15..	38,000 gal.	normal	76 deg. F.
July 29..	41,000 gal.	3,000 gal.	(?)
July 29..	56,000 gal.	18,000 gal.	(?)
July 30..	60,000 gal.	22,000 gal.	84 deg. F.
July 30..	64,000 gal.	26,000 gal.	84 deg. F.
Next hard shock occurred at 9 p.m., July 30.			
July 31..	52,000 gal.	14,000 gal.	84 deg. F.
July 31..	52,000 gal.	14,000 gal.	80 deg. F.
Aug. 1...	59,600 gal.	21,600 gal.	79 deg. F.
Next hard shock occurred at 7 a.m., Aug. 1.			
Aug. 1...	55,000 gal.	17,000 gal.	81 deg. F.
Aug. 2...	50,000 gal.	12,000 gal.	80 deg. F.
Aug. 2...	60,500 gal.	22,500 gal.	77 deg. F.
It is quite probable that another shock occurred in this interval and was not noted, as about 20 shocks of varying intensity were noted during six days recorded.			
Aug. 3...	55,000 gal.	17,000 gal.	77 deg. F.
Aug. 4...	53,000 gal.	15,000 gal.	76 deg. F.
From Aug. 4 to Aug. 15 water has varied from 45,000 to 50,000 gal.			

It is to be regretted that owing to lack of facilities, no account can be given of the chemical characteristics of the water during this period. The ordinary mine water carries considerable iron and sulphuric acid, and when allowed to stand the odor of sulphureted hydrogen is notable. The water during and after the shakes seemed to be more acid and the sulphureted hydrogen more noticeable.

Careful search was made to find if the sources (springs in lower level) of the water had increased in number or changed in location, but it was found that no change had occurred, the old sources simply giving forth more water.

The earthquake here mentioned is the same as felt in Mexico, D. F., and that caused so great damage at Acapulco and Chilpancingo, Guerrero, so that its center must have been some hundreds of miles from this district.

Beyond the increase in the fuel bills due to increased pumping no damage or inconvenience whatsoever was experienced here; not so much as a fall of loose rock in the stopes of a very loose vein.

The Many Peaks Copper Mine, Queensland

Worked by the Mt. Morgan Gold Mining Company; Low-grade Silicious Ore; Used at Mt. Morgan as Flux in Pyritic Smelting

BY J. BOWIE WILSON*

The property, which is owned by the Many Peaks Copper Mining Company, Ltd., but is being worked by the Mt. Morgan Gold Mining Company under lease, is situated 25 miles south-southwest of Miriam Vale, a railway station on the Queensland Government North Coast Railway. A very rough track leads from Miriam Vale over the Many Peaks range to the mine, and during the initial stages of the development of the property all stores and supplies either came over this track, by horse and bullock teams, or by the longer but flatter road up the Boyne river from Gladstone, a town upon the shores of Port Curtis, the finest natural harbor upon the Queensland coast.

The climate of the district is good and

MAIN TUNNEL ENTRANCE WITH OFFICE AT THE RIGHT

the surrounding country, although extremely rough, is well timbered and there is a plentiful supply of iron bark and other hardwood timbers for mining purposes, while at a little distance from the railway there is a big forest of pine which it is proposed to open up to supply soft wood not only for building construction at the mine but for the district surrounding Gladstone. The official name of the township in which the mine is situated is Nanandu, but is more commonly known as Many Peaks.

The District

Upon the Mt. Morgan Company taking control of the property toward the end of 1906, the government decided to connect the mine with the railway system of the state as the company had stated that they would haul 80,000 tons per year from Many Peaks to its smelteries at Mt. Morgan. The Boyne Valley Railway was started in 1908 and it is expected to be open for traffic to the mine early in 1910. Instead of connecting with the railway at Miriam Vale the new line will follow the valley of the Boyne river for the greater part of the way, and, although this means the construction of nearly double the length of line, this route avoids the extremely rough Many Peaks range of mountains which would have necessitated steep grades and expensive tunnels. The longer route will also make available for closer settlement the fertile banks of the Boyne river and thus assist in the opening up of the district. This railway will open up a district which has been proved to carry mineral, chiefly copper, over a large area, but the development of these deposits has been delayed owing to lack of transportation to the coast. There are, or have been, mining camps at Glassford Creek, Mt. Hector and Cannindah, where the mining and smelting of copper ore have been in progress but without success, largely, it is claimed, through the excessive freight charges. The only mine at present being actively developed in the district is the Many Peaks, where work is being actively pushed ahead to enable a large daily tonnage to be extracted from its enormous deposits as soon as the railway arrives.

*Consulting mining engineer, 82 Pitt street, Sydney, N. S. W.

Character of the Property

The mine was discovered by Messrs. Bailey & Lynch, who located the outcrop and did a little work in trenching and sinking pits. In 1898 they sold their prospecting claim to a small syndicate, called the Many Peaks Prospecting Syndicate, composed chiefly of young mining engineers employed at Mt. Morgan. After securing two prospecting areas of 160 acres each this syndicate immediately started to exploit the property.

The outcrop strikes roughly north and south and across a steep spur which runs down to the Boyne river and has Deception creek upon its northern side and a small unnamed creek to the south. The highest point in these prospecting areas is 700 ft. above the bed of Deception creek and the outcrop of the lode lies just below this level. The outcrop consists of ironstone and gossans and can be traced on the surface over a considerable distance. In several places it is characterized by the occurrence of big masses of ironstone. Most of the outcrop was either barren or only low in value.

The outcrop lying, as it does, upon the top of a steep spur, lends itself to prospecting by means of adits. The first work started by the syndicate was the driving of a tunnel on the eastern side of the deposit to cut the orebody at a depth of 150 ft. The lode was cut at 110 ft. from the mouth of the tunnel but was a great disappointment as it was found to be still oxidized. It showed quite a width of oxidized material and, that the original material had been heavily mineralized was indicated by the existence of huge vugs, some of them almost large enough to be called caves, but the fact that the material carried only a low copper content instead of the rich secondary ores expected was very disheartening. After driving some distance both north and south along the lode and connecting the workings with the surface by a raise, to improve the ventilation, a winze was sunk in the orebody. This passed through a couple of caves and entered the sulphide zone at a depth of 30 ft. and continued for 70 ft. in an ore composed of a dense fine-grained marcasite. At a depth of 60 ft. a crosscut was driven west, proving the lode to be at this point at least 40 ft. wide. The ore exposed in the winze and crosscut consisted of the same dense micro-crystalline iron pyrites and averaged about 2½ per cent. copper but did not carry more than about 5 per cent. silica.

The No. 2 workings were started about

1000 ft. to the south at a point where a steep gulley, running into the spur, allowed a tunnel to be driven along the strike of the lode about 300 ft. below the highest point of the outcrop. In all about 670 ft. of driving and crosscutting was done here with rather satisfactory results. At a point 300 ft. in from the mouth of the tunnel a crosscut showed 75 ft. of ore. At 200 ft. a winze was sunk 40 ft. in ore and from the bottom a crosscut showed 40 ft. of ore of a dense pyritic nature carrying about an average of 5 per cent. copper and about the same percentage of silica. As this was considered payable, and as no payable copper ore had been previously reported in the district, in July, 1909, application was made to the government for the conversion of one of the prospecting areas into a "reward claim" of 160 acres; this was granted.

Reward Claims in Queensland

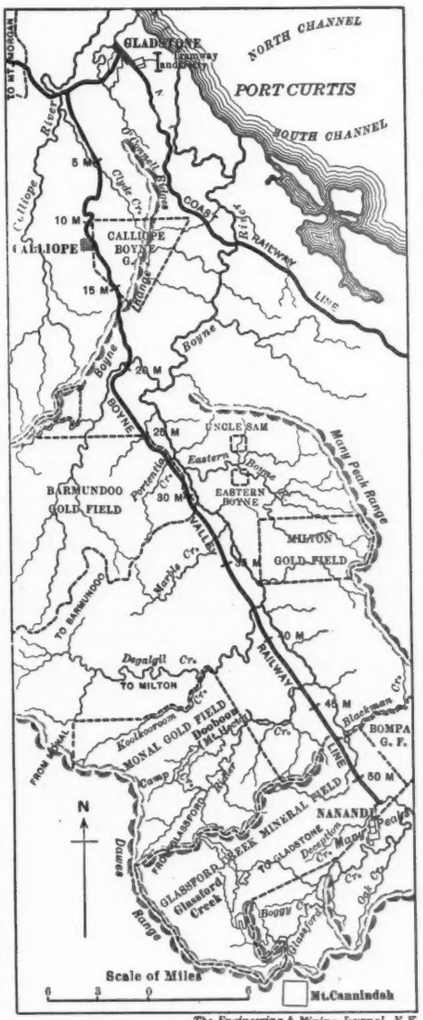
The great advantage in possessing a reward claim is that whereas a mineral lease requires the employment of one man for every 10 acres to fulfil the labor conditions, and failure to employ this number, without having first obtained exemption from the minister of mines, which exemption has to be renewed every six months and is hard to obtain after the first application, makes the lease liable to forfeiture and jumping, a reward claim is fully manned by one man. These reward claims are only granted to the first discoverers of payable mineral in a district and the mining warden has to visit the locality and satisfy himself that payable mineral has been discovered before he recommends the registration of the claim.

To prospect the northern end of the orebody, located in the No. 1 workings, a tunnel was started at a greater depth in a gulley on the eastern side of the spur so as to cut the deposit at a depth of 370 ft. The lode was intersected 480 ft. from the mouth of the tunnel but after driving 12 ft. in dense pyritic ore of low grade an intrusive dike was met and the tunnel stopped. A drive was then driven along the western edge of the orebody for 260 ft. south, which brought it beneath the winze sunk below the No. 1 workings. Crosscuts from this drive at 60 ft. and the end showed 40 ft. and 70 ft. respectively of dense pyritic ore, but the copper content only averaged about 2 per cent. while the silica ran a little higher.

History of the Company

In 1903 between £4000 and £5000 having been spent in prospecting work, 2050 ft. of driving and 370 ft. of raising and sinking and it being estimated that fully 300,000 tons of sulphide ore averaging 2½ per cent. copper had been proved, an attempt was made to form a company with a capital of £25,000 to mine the ore and extract the copper by the natural cementation process or leaching so successfully used at Rio Tinto, Spain, to extract the copper from an ore almost identical, both chemically and physically, with the Many Peaks ore. The proposed process being new to Australia and the metal markets being depressed, the attempted flotation was a failure and had to be withdrawn.

Shortness of funds necessitated the temporary suspension of prospecting work and three mineral leases, that had been taken up to the north and south of the



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BOYNE VALLEY RAILROAD, QUEENSLAND

reward claim, had to be abandoned through inability to comply with the labor conditions. These leases were afterward taken up by the Queensland Copper Company, a London company owning and working the Mt. Perry copper mine, and are still held by them. The reward claim was continuously manned and the workings kept in order and a little work done.

Geology of the Deposit

The non-existence of rich secondary ores is perhaps explained by the nature of the inclosing country rocks. These, although they have not, as far as I know, been carefully examined microscopically, consist of altered sedimentary rocks and are much shattered and of an open nature. They have not allowed the copper-bearing solutions, resulting from the oxidation of the lode capping, to concentrate in the lower portion of the lode but have allowed their dispersion over a large area. This is well illustrated in the old No. 1 tunnel where the country rock, for some distance before the leached lode was reached, carried a low percentage of copper distributed, as carbonate and oxide, along the many joint faces. This wide distribution of the secondary copper has prevented the formation of rich bodies of secondary ore. Another interesting feature about the Many Peaks deposit is that in several places, where ore was expected, only boulders of pyritic ore have been exposed, surrounded by shattered country. An explanation of this may be that the boulders are the remains of the once solid orebody which has oxidized in this form, leaving kernels of ore to represent the disappearing orebody. If this is so it is only natural to find the boulders surrounded by crushed or shattered country rock, as such a basic ore as this could not leave a silicious skeleton strong enough to support the walls.

The genesis of the deposit is not at present clear and before any theory can be advanced more knowledge is required about its behavior in the lower levels. The orebody appears to belong to the class of replacements but the action has been very complete and the junction between ore and country in most places is clearly marked. Limestone outcrops on the western side of the deposit but so far has not been proved to have any influence upon the formation of the orebody.

Acquisition of Property by Mt. Morgan Company

In 1906 the Mt. Morgan Gold Mining Company, Ltd., which was searching for a suitable flux for its silicious copper gold ores, approached the Many Peaks Syndicate and an agreement was eventually signed in November of that year by which the Many Peaks Syndicate sold to the Mt. Morgan company the exclusive right of mining upon the reward claim in consideration of the payment of a royalty of 2s. 6d. per ton on all ore treated by the Mt. Morgan company. This agreement cannot be terminated by the Many Peaks Syndicate but the Mt. Morgan company, which is bound to mine or pay for a minimum quantity of 25,000 tons per year, can do so by giving six months' notice.

The Mt. Morgan company took over the working of the reward claim in December, 1906, and also took up, in its own name, a mineral lease for the construction of a tram line and the erection of ore bins,

etc., water rights along Deception creek, and homestead areas for the erection of offices, stores, etc. After a survey of the underground workings and surface features had been made, it was decided to attack the deposit from the northern end of the reward claim, as the rugged nature of the country at the southern end, where the richest ore had been exposed, made it practically impossible to construct a line to connect with the proposed terminus of the government railway. A large working tunnel, upon the 470-ft. level, is now being driven from a gulley near the northern end of the reward claim on a bearing nearly due south. This tunnel, 7 ft. high and with an 8-ft. cap, will act as the main entry of the mine, and is driven for the greater part of its length in the country upon the eastern side of the orebody.

Plan of Operations

The general scheme, originally laid out, for mining the orebody is as follows: Upon the 470-ft. level a main ore way to be driven clear of the orebodies and to be kept as nearly as possible 50 ft. away; turnouts, on a radius of 70 ft., as it is proposed to haul the ore from this level with electric locomotives and side-dumping ore cars, to be spaced every 200 ft. and to connect with the drive along the ore channel above which mining will be carried on. This scheme of a double drive upon this level was adopted because it was recognized that this main tunnel, being the only exit for ore, should be protected against accident as carefully as if it was the main shaft of a mine. If only the one drive, along the orebody, had been relied upon, then when mining had advanced and it was necessary to fill large areas of depleted stopes immediately above the drive, there would always be present the danger of an accident causing a block and if this occurred near the mouth of the drive the whole output of the mine would be affected. By having the main ore way well in the country rock this danger is avoided and the working part of the mine is divided into sections by the turnouts, in any one of which accidents, through squeezes or falls of ground, can occur without affecting the rest of the mine.

Levels will be opened up along the ore channel on the 370-, 270- and 170-ft. levels and connected in the usual way by filling passes and oreshoots to the levels above and below, all ore being eventually passed down to the 470-ft. level before it is withdrawn from the mine. The passes from one level to the other will be placed so that they will come one below the other and break joint with each other. The chute doors will be arranged to deliver either into trucks or into the top of the pass below as desired. The details of the method of mining to be adopted were not worked out, but, as the orebody is wide (in one place being at least 90 ft.), the ore hard, and the country on the walls promises to be treacherous, it will be clearly necessary not to have too much ground open at any one time and to keep the stopes well filled. With an orebody containing such dense pyrites and drained by a main tunnel it will also be necessary to take great precautions to guard against fire.

Development by Mt. Morgan Company

Since the Mt. Morgan company took control of the working of the mine and up to May 30 of this year, when it issued its usual report, 5889 ft. of driving, sinking and raising has been completed and a careful estimate shows the ore actually in sight above the 470-ft. level to be 840,000 tons of 2240 lb. Up to the present no attempt has been made to explore for other orebodies along the strike of the lode. The lode at the 470-ft. level maintains its size and composition and has every appearance of extending in depth.

The ore will be delivered from the mine by electric locomotives to the top of bins, built beside a siding or extension of the government railway, which will deliver directly into the railway trucks and be hauled to Mt. Morgan.

The acquisition of the mining rights of this large pyritic copper-bearing orebody is of great value to the Mt. Morgan company, as by substituting a copper-bearing pyritic flux for the barren ironstone now in use both the capacity of the furnaces and the cost of smelting should be materially affected and both in the right direction. As the ore contains just about sufficient gold to pay the royalty it is estimated that the copper contents will be sufficient to pay for the mining and transport of the ore and a flux for the silicious ores will be provided at a small profit.

Transvaal Gold Production

Gold production in the Transvaal in September and the nine months ended Sept. 30 was as follows:

	1908.	1909.	Changes.
September, oz..	587,634	606,385	I. 18,751
Nine months, oz	5,159,859	5,475,374	I. 315,515
Nine mos., value	$106,654,286	$113,175,981	I.$6,521,695

The number of mines reporting this year in September was 72, having a total of 9620 stamps in the mills. Of the gold reported for the month 585,736 oz. came from the Witwatersrand, and 20,649 oz. from outside districts.

Recruiting labor has been slower in recent months than the losses by expiration of time, deaths, etc. It is estimated that the present supply of unskilled labor is about 80 per cent. of that which could be profitably used in the mines. In Septembr, 3204 Chinamen were still employed in the mines.

Rhodesian Mining Notes

Special Correspondence

The mining outlook in Rhodesia is exceedingly promising. The most talked of district at present is the Abercorn, where an undoubtedly important discovery has recently been made. This is the Shamva, on which the Consolidated Goldfields company is rumored to have exercised an option. The orebody is an auriferous conglomerate. The mode of occurrence of the gold, however, differs in some important respects from that of the Witwatersrand, and although the conglomerates themselves extend for many miles there is no reason for expecting that continuity of pay ore which characterizes the Witwatersrand conglomerates. There is little official information regarding the Shamva, and indeed only one published report, and that by a Mr. Powell, who is stated to be an Australian engineer.

The Shamva property is situated on a hill which rises about 850 ft. above the level of the surrounding plain. The side of the hill is steep and for this reason the lode lends itself very favorably to being worked by adits to a depth of about 600 ft. The lode formation is a fine-grained sandstone showing pebbles throughout. The dip is nearly vertical. The Shamva mine has nearly 4500 ft. on the strike of the conglomerate and, owing to the Rhodesian mining laws, allowing a company which has the outcrop of the lode in their property to follow it on the dip as far as it can be worked, is in a very favorable position. How much of the strike is auriferous is not yet known.

Development of the Shamva Mine

The following is a summary of results so far achieved:

No. 1 tunnel is the farthest west. It is in about 150 ft. and the orebody was struck at 80 ft. For the first 30 ft. the value was 21 dwt.; since then no assays have been made, but the pannings are good. The hight of back above this tunnel is about 75 ft. No. 2 tunnel, situated about 525 ft. east of No. 1, has been driven about 240 ft. The lode was cut at 100 ft. and the last 140 ft. averaged 12½ dwt. The face of the tunnel is still in pay rock as shown by pannings. A drive has been carried along on the footwall of the lode for a distance of about 130 ft. east and is still in good ore. At a point about 70 ft. east along this drive a crosscut has been started, and the first 30 ft. driven averaged over 10 oz. per ton.

About 1½ miles to the west on the same line the Consolidated Goldfields company has an option on another property. The formation is exactly similar to the Shamva and the ore so far is proved over a fair width.

Chrome and Other Deposits

Base metals are already receiving attention. The most important at present is probably chrome iron ore, which is destined to play a substantial part in the success of the Rhodesian mineral industry. A big scheme for development is now being planned. Ore has been exported for the last four years. Lead, copper and antimony are produced as by-products. The Edmundian copper mine has been producing for some time, while another of great promise, the Umkondo, starts producing this year. All these ore occurrences are described in Johnson's "Ore Deposits of South Africa," Vol. 1.

In the country north of the Zambesi other copper mines are developing and form a connecting link with the great Katanza deposits. Scheelite and wolframite are also being mined.

Rhodesia is essentially a country of small mines worked by private individuals. It possesses already over 300 producing mines and has produced over £13,000,000 worth of gold since 1898. It, however, has three or four moderately large gold mines and holds out promise of quite a number of big low-grade deposits.

The important Waukie coal mine has been reconstructed on a basis which is confidently expected to turn the concern into a dividend payer. It has suffered under great disadvantages, but has practically a monopoly of the Rhodesian trade and consequently a fairly large output. It should share the prosperity which now seems to pervade the whole country.

Asbestos

Occurrences of asbestos, discovered in 1908, are being opened in the Victoria district. The syndicate has just issued a report of operations from August of last year to the end of March, 1909, which show that about 120 tons have been exported to England. In addition there were mined about 100 tons of lower-grade fiber, which has been stacked on the property awaiting the time when it can be handled at a profit. It would seem from advices issued by the manager that not only can a monthly output of 30 tons of best grade fiber be maintained, but that a new quarry containing larger and richer material than that now being worked is about to be opened up.

Diamond Mines

There has been no diamond output lately. The Somabula alluvial in which the diamonds were found is now practically deserted. Development is proceeding apace on the diamond pipes recently discovered at Bambesi. The largest of these —named the Colossus—is claimed to be larger than any diamond pipe discovered. Washing tests have been delayed owing to the fact that a section of the mine has been under water, with the results that all the rock extracted has been the unoxidized "blue" which, without mechanical treatment, would take at least a year to disintegrate sufficiently for treatment. Crushing rolls capable of treating 120 loads a day are now being erected.

La Rose Consolidated

D. Lorne McGibbon, the new president of La Rose Consolidated Mines Company announces changes in the directors as follows: John McMartin, Duncan McMartin, Henry Timmins and Frank W. Holmes resigned and George Washington Stephens, Shirley Ogilvie, Alex. Pringle and Victor E. Mitchell, K. C., all of Montreal, elected in their place.

The annual report of the company for the fiscal year ended May 31, 1909, shows the net value of its product for the period was $1,320,147. The cost of producing silver was 16.31c. per oz., while the average selling price was 51c. per oz. Almost the entire output of silver (about 3,000,000 oz.) was mined from the La Rose mine, nevertheless the same ore reserves as were reported a year ago have been maintained. In the spring of 1909, the company acquired the Lawson mine, upon which considerable development has been done, and which promises to be an important and profitable acquisition.

The work done during the year was as follows: Drifting, 3586 ft., raising, 410; sinking, 322; crosscutting, 1985; trenching, 12,145; open-cutting and stoping, 7477 cu.yd. Nearly all this work was upon La Rose. A shaft on the No. 3 vein of this vein developed good ore to a depth of 135 ft. On the Princess 72 ft. of sinking was done and a new level started at a depth of 135 ft. A vein of cobalt ore was open-cut on the University and a shaft 90 ft. in depth sunk on the No. 4 vein. On the Lawson work was chiefly confined to trenching with the result that several new veins were discovered.

ORE RESERVES IN LA ROSE.

	Tons.	Ounces Silver.	Estimated Profit.
Partly Developed			
Main vein	3,180.4	2,668,088	$ 987,329.96
No. 3 vein	278.6	790,605	283,326.11
McDonald vein	926.7	748,621	277,469.42
No. 10 vein	188.6	100,391	38,100.40
	4,583.3	4,307,705	$1,586,225.89
Country Rock			
McDonald	5,747.0	454,013	142,812.95
	10,330.3	4,761,718	$1,729,038.84
Indicated Ore			
No. 3 vein	68.9	206,700	74,019.61
	10,399.2	4,968,418	$1,803,058.45

The accompanying tables give the shipments, production costs and ore reserves. In the table of production costs the item, $206,258, for marketing ore includes charges as follows: Smelter deduction on silver, $87,396; treatment charges, $47,359; transportation, $61,524. In the table of ore reserves in La Rose, the estimated profit is figured by assuming a value of silver of 51c. per oz., adding $20 per ton of ore for cobalt, and deducting operating and marketing charges estimated according to previous year's results. No estimate is made of ore reserves in the other properties.

The contract made with the Northern Customs Concentrators, Ltd., for treatment of the low-grade ore at present upon the various dumps and which the company continues to mine, is expected to prove an important source of revenue. During the year there has been paid to shareholders out of net earnings dividends to the amount of $633,089 and at the same time, a surplus of $421,481 has been accumulated.

The ore shipments for the period were 6063 tons containing 2,915,706 oz. of silver. The sales of cobalt amounted to $24,059 and of arsenic $332. From the sale of ore, $1,320,147 was received.

LA ROSE SHIPMENTS, JUNE 1, 1908, TO MAY 31, 1909.

	Dry Tons.	Net Value per Ton.	Gross Ounces Silver.	Net Value.	Oz. Silver per Ton.	Cobalt, Per Cent.	Nickel, Per Cent.	Arsenic, Per Cent.
Silver-Cobalt-Nickel ore	1,671.8260	$ 663.32	2,264,895.49	$1,108,947.09	1,354.7	8.28	8.26	36.27
Low-grade Silicious ore	4,318.5200	41.72	604,646.43	186,539.86	140.0	.....	.....	.....
Low-grade Cobalt ore	39.8430	78.90	1,288.58	3,143.75	32.3	12.57	.....	.....
Concentrates	31.6210	272.13	18,528.51	8,605.13	586.0	.....	.....	27.46
Nuggets	1.8605	6,940.12	26,347.57	12,912.09	14,161.8	.....	.....	.....
Total	6,063.6705	$ 217.71	2,915,706.58	$1,320,147.92	480.8 (average)	.....	.....	.....

PRODUCTION COSTS AT LA ROSE.

		Per Ton Ore.	Per Oz. Silver.
Operating expense	$259,088.77	$42.73	$0.0889
Depreciation on plant	3,343.47	0.55	0.0011
Marketing ore	206,258.37	34.01	0.0707
Concentration	6,375.20	1.05	0.0022
Corporation and Toronto office	2,100.00	0.35	0.0007
	$477,165.81	$78.69	$0.1636
Less rents and interest	1,603.28	0.26	0.0005
Total cost of production	$475,562.53	$78.43	$0.1631

Safety Precautions in Shot Firing

Description of Mining Methods and Details of the System of Shot Firing at the Dalton Main Collieries, One of the Largest Operations in England

BY HENRY M. PAYNE*

The Dalton Main Collieries, Ltd., operating the Roundwood and Silverwood mines, near Rotherham, England, is one of the largest coal companies in that country. In July last I visited their Silverwood mine, from which is taken the greatest output of coal per year, of any shaft of its depth in England.

The shafts are circular, 21 ft. in diameter, and extend 2238 ft. to the Barnsley seam. The sinking of these two shafts, which was carried on simultaneously, was commenced in April, 1900, and completed in December, 1903. Large quantities of water were encountered during the first 450 ft., and were handled during the sinking process by huge pumps, suspended by chains. Subsequently a 12-ft. circular shaft was sunk 450 ft. to serve as a reservoir, and it now supplies the entire colliery for all purposes.

Rope Guides Are Used in the Shaft

The hoisting engines at this plant are also the largest of their kind, having 48-in. cylinders, 7-ft. 6-in. stroke, with 24-ft. winding drum, and are capable of hoisting 6000 tons per day, at a steam pressure of 120 lb. The cages are 18 ft. high, carrying three decks of four cars each, and are loaded and unloaded at the top by a hydraulic decking arrangement which changes all 12 cars simultaneously. Instead of using fixed cage guides, at each corner of the cages is a lock-coil rope, under 14 tons tension, and between the cages hang two rubbing guides under similar tension. Each car carries 1200 lb. of coal, making about seven tons per hoist.

Ventilation is furnished by a 13-ft. 4-in. Schiele fan, giving 220,000 cu.ft. of air at 1-in. water gage. Electric haulage is used throughout the mines of the company, the haulage motors varying from 7½, 20, 40 and 65 to 110 h.p., using a three-phase current of 550 volts, 50 cycles per second.

The tipple and screens are located 450 ft. from the shafts, in order to avoid the dust from the screens passing into the intake air supply. The coal is cleaned by pickers from conveyer belts, and the gob is thrown onto other conveyer belts which deliver it into hoppers whence it is loaded into cars and emptied on the culm pile.

The whole of the small coal is passed through a washer whose capacity is 130 tons per hour, after which it is carried by aërial tramway to the coke ovens. These ovens are in two batteries, the first consisting of 36 horizontal-flued by-product ovens producing 800 tons per week, and the other of 44 regenerative vertical-flued ovens producing 1200 tons per week. The principal by-products are ammonium sulphate, ammonium chloride, tar and benzol.

The company also operates a brickyard fitted with Bradley and Craven machines and a 14-chamber Warren continuous-type kiln, having a capacity of 20,000 bricks per day.

The Longwall System of Mining Is Used

The longwall system of mining is used, and the average progress of the face is from 250 to 300 ft. per year. The cost of timbering is held down by heavy cribbing at the face, so as to render possible the recovery of much of the back timber without danger to the miners.

Special shot-firers are employed, and are appointed in writing by the manager, with special reference to their experience, reputation and sobriety. One of the requirements for eligibility is that the applicant must hold a second-grade foreman's certificate.

When the miner has his working place ready to load and fire, he comes out and reports to the mine boss the number and location of the holes. The shot-firers, who go in the mines after the shift has come out, learn from the mine boss the locations and number of shots to be fired in each district, and each shot-firer then goes to the storekeeper and receives a definite number of detonators, for which he signs a receipt. The explosive having already been taken to the working place by the contractor or miner, *in a sealed, locked can, whose capacity is limited to 5 lb., and to which only the shot-firer has a key*, the shot-firer then proceeds to examine the place. He has previously receipted for a certain number of detonators, and on his report he also notes the depth of the hole, its direction, the amount of stemming, the effect of the shot, etc., numbering each hole he shoots consecutively. The style of report blank used by the shot-firer is shown by the accompanying diagram.

When the shot-firer comes out of the mine he turns in this report, together with any unused detonators, and the total number of shots fired and detonators returned must equal the number of detonators for which he receipted.

The company provides the explosives and detonators, and the prices paid the miner are fixed accordingly. There are 60 "permissible" explosives available for use in England, and the coal-mines regulation acts from 1887 to 1909, inclusive, are very rigid in their requirements. Among other specifications it is required that:

"The charge shall be fired by a competent person appointed in writing by the owner, agent, or manager, and not being a person whose wages depend on the amount of mineral to be gotten.

"The charge to be placed in a properly drilled shot hole with sufficient stemming, and to consist of a cartridge or cartridges of not more than one description of explosive.

REPORT BLANK USED BY SHOT-FIRERS.

Date.	No. and Name of District.	No. of Place.	Time.	Amount and Kind of Explosive.	Kind of Deto.	No. of Shot.	Good or Bad.	Depth of Hole.	Amount of Stemming.	If Horizontal. Yes or No.	If Vertical.	If Slanting up or down.	If a Miss Shot.	Deto. Recovered by Whom.	Amount of Explosive Recovered.	Name.

"When two or more shots are being fired in the same place and are not being fired simultaneously, the shot-firer must make an examination for gas immediately before the firing of each shot, and must not fire the shot unless he finds the place where the shot is to be fired, and all contiguous accessible places within 20 yd. free from gas, and safe for firing.

"The use of permitted explosives in main haulage roads and intakes is subject to the further condition that every part of the roof, floor and sides, within a distance of 20 yd. from the place where the shot is fired, must, unless naturally wet, be thoroughly watered at the time of firing."

The precautions of the record book, and check on number of holes shot, detonators issued, etc., are all taken by the Dalton Main Collieries Company, in addition to the requirements of the coal-mines regulations.

I am indebted to William H. Pickering, H. M. inspector of mines, and James Elce, Esq., of the Collieries company, for much of the information which I have here outlined.

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The Safe Use of Electricity in Coal Mining

By Sydney F. Walker*

George Wood's paper, read before the Coal Mining Institute of America, and reported in The Engineering and Mining Journal, July 3, is full of matter that is of great interest, both to mining and to electrical engineers. At the present time, in the United Kingdom, both mining and electrical engineers are much exercised over the somewhat frequent accidents that have taken place in mines, by which men have been killed, and anything which can be done to reduce the chances of accidents should be of great value.

Mr. Wood has apparently given considerable thought to the whole matter, but it appears to me, from a perusal of his paper, that he is mistaken in some of the points which he makes. He says, for instance, that it has been repeatedly attempted to ignite fine coal dust by means of the electric arc, but so far, he believed, without success. I think that a little consideration would have led him to modify his view of the matter. The ignition point of coal is about 1000 deg. C., and the temperature of the electric arc is some 5000 deg. C. It appears to me a self-evident proposition that coal dust will be ignited, if placed in an electric arc.

Coal Dust Can Be Ignited by an Electric Arc

I believe I am correct in saying also that fires have occurred, in the United Kingdom at any rate, through the ignition of coal dust by arcs formed between the ends of broken cables. In addition to this, experiments have been made with incandescent lamps, whose temperature is considerably lower than that of the arc, by burying lamps in coal dust, with the result that the dust has been raised to ignition temperature.

Mr. Wood then goes on to observe that an electric spark of almost any potential will ignite gas in proper percentages, and illustrates the ignition of the charge in automobile engines as proving his contention. I am afraid that Mr. Wood is again mistaken. The fact that a spark passes is proof of a very high temperature and of the presence of a certain amount of energy, but a spark does not always possess sufficient energy to ignite an explosive mixture. The spark which passes through the charge in an automobile engine has a pressure of some 6000 to 8000 volts, and automobiles will know how often trouble arises, when a "fat spark" is not obtainable. A great many of the troubles with motor cars are due to misfires, arising from the spark not being sufficiently fat, that is to say, its not having a sufficient amount of energy present in it.

A good many years ago, I carried out a series of experiments, to determine this. It was at the time when the electric jump-spark fuse was coming into general use, and there was considerable trouble with the fuses. Some would fire and some would not. My experiments pointed out that it was not only a spark *per se* that was required, but a spark carrying a certain energy. The temperature of the spark was necessary, but it was also necessary that a certain energy, or as automobilists express it, a certain fatness should also be present. A weak spark might ignite an explosive mixture, if everything was very favorable, but the chances were against it.

On this side of the water, there has been a good deal of controversy as to whether the spark, which sometimes passes when electric signal wires are pressed together on engine planes to make a signal, would ignite gas. I made some careful experiments upon this about the same period, and my experiments were repeated by the managing director of one of the largest coal-owning firms in the United Kingdom, on a much more elaborate scale. The result we both arrived at was, that the signal spark would not ignite gas. It is fair to say that a later experimenter did succeed in igniting gas by means of the spark at the trembler contact of an electric bell, but the cases in which gas would ignite were few. Mr. Wood remarks that ignition will only take place when a current is broken. This again is not strictly correct, as a small wire carrying a large current, as it may do in the case of a short circuit, raising the wire to a white heat, would also ignite an explosive mixture. I have ignited an explosive mixture with a few inches of copper wire raised to a red heat. The time factor is an important one in all these questions, and therefore the velocity of the air current, and the rapid passage of the air past the point where sparking or arcing is taking place, would have an important bearing upon the ignition.

Electric Shocks

Mr. Wood also discusses the interesting question of the comparative danger of electricity, at different pressures, and expresses the opinion that 500 volts is more dangerous than 250. This is quite correct, providing that both are continuous-current pressures. With alternating currents, 250 volts is sufficient to kill. In fact, men have been killed in the United Kingdom with considerably less than 200 volts alternating. It should be borne in mind that the effective alternating pressure, that which is applied to lamps, motors, etc., is less than half the actual difference of pressure that a man will receive in the form of a shock. The alternating pressure applied to lamps and motors, the effective or virtual pressure as it is termed, is practically the average pressure. The pressure rises from zero to very much higher than the working pressure, falls to zero, rises to higher than the working pressure, in the opposite direction, falls to zero again, and so on, these changes taking place within 1-100 part of a second, in modern apparatus. The actual difference of pressure experienced when a shock is received, say from a 200-volt alternating-current service, is 560 volts, and this is one of the reasons why alternating-current pressures are so much more dangerous than continuous current, for the same working voltage. Once, however, that killing pressure is reached, the danger of higher pressures is apparently no more than the lower pressures, except in special cases.

Ability of Men to Withstand Shocks.

The conditions under which men receive shocks vary, and the ability of men to withstand shocks also varies. There is a record of a man, in the early days of electric power work in mines, who used to test for disconnections on a 500-volt continuous-current service, with his tongue. Such men are rare. As a rule the average man will be killed by a 200-volt alternating-current service, or 500 volts continuous taken from hand to hand, hand to foot, or head to foot, and he apparently runs no more danger from 1000 volts, or 2000 volts, than from 200 volts. There is also a peculiar feature in connection with high pressures. Many a man has owed his life, when making contact with a service at very high pressure, to the terrible burning which he received from the arc formed between the conductor he touched, and his body. The arc formed, burns the surface of the skin to such an extent that it sets up a resistance in its own path sufficient to save a man's life. This does not always happen with very high pressures, but it has in a number of cases.

Conditions Produced by Electric Shock

Mr. Wood is quite correct in saying that the conditions produced by electric shock are similar to those produced in drowning. Drowning, hanging, poisoning by carbonic acid gas, electric shock, and to a smaller extent the common complaints known as chest troubles, in which breathing is rendered difficult, are all of the same nature, chest troubles being of course a minor form. In all of them the action of the heart is arrested, either directly by a shock passing along the nerve controlling the heart and the lungs, or indirectly by the cessation of the action of the lungs, and by additional work being placed upon the heart to such an extent that it gradually ceases to beat. In all cases the heart is only temporarily stopped, and if the cause is removed, as when water is allowed to run out of the lungs in drowning, when the patient is removed to fresh air after carbonic acid poisoning, if the

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rope is removed in time after hanging and the mechanical actions which go on normally, during life, are imitated, the heart may gradually recover, gradually acquire the power of restarting, and the victim then lives once more.

It would be exceedingly interesting to have some account of the results obtained with the cables insulated with varnished cloth, in mines, mentioned by Mr. Wood. The insulation of cables in mines is one of the greatest difficulties that have to be contended with in the use of electricity in mines. Rubber is affected by wet. Its gums are oxidized, and it tends to break up. Rubber also is expensive, if it is used in sufficient thickness to be a proper protection to the conductor, and hence there has been the temptation to use a small thickness, with generally disastrous results. Again the large amount of poor rubber that was brought from West Africa some little time ago, and which was worked up into insulating material for cables, and which could not be distinguished, when laid on the cables, from the best rubber, but which broke down in a comparatively short time, has led to rubber being largely discounted.

In the coal mines of the United Kingdom, bitumen has largely taken the place of rubber. Its insulation resistance is not as high as that of rubber, but it can be obtained in greater purity. It has a greater sparking resistance for a certain thickness, and it is considerably cheaper. Paper-covered cables are also being used to an increasing extent in British coal mines, particularly with high tensions, 3000 volts or thereabouts, with three-phase currents. One of the principal reasons for its use is the lower cost, and the higher resistance to sparking. The insulating envelop of a cable has two distinct offices to perform. It has to prevent the leakage of current from the conductor, and it also has to prevent sparking from one conductor to another, in the case of three-phase cables, and from the conductor to any other conductor in the neighborhood, in the case of continuous currents.

With high pressures, 2000 and 3000 volts, the resistance to sparking is at least as important as the resistance to leakage. The pressure available for driving a spark through the insulating envelop of the cable is not merely the pressure of the service, 3000 volts, or whatever it may be, it is 2.8 times that pressure, owing to the rising and falling and reversing of the pressure, and in addition it is often multiplied considerably above those figures, owing to the induction which takes place when a large portion of the load is suddenly thrown off.

The Blaisdell Coscotitlan Syndicate is successfully treating, by cyanidation, tailings at Pachuca, Mexico, that average $3 in gross content, $1.25 of which is gold and $1.75 silver.

Coal in Peru

The Peruvian Consul General at New York reports the discovery of an important new coal district in the department of Huayday, near Libertad. The coal is found in two beds, 7 and 9 meters thick. An analysis gives the following: 3.30 to 4.81 per cent. volatile; 2.18 to 9.10 per cent. moisture; 82.90 to 87.74 per cent. fixed carbon; 4.70 to 5.27 per cent. ash; calories, 7666. The coal has been tested on steamers and is reported equal to Lehigh coal. The district is 155 kilometers from Port Salaverry and 112 kilometers from Malabrigo. Railroads are already built toward the new district, and in one case it will be necessary to extend the line only 65 kilometers, and in the other 90 kilometers. The coal area is from 100 to 120 sq.km. The district was discovered by American engineers. It is a plan of the government to take control of it and develop it for the use of the coast steamers and for domestic purposes. The coal in Peru is now received from Australia and England. The English coal costs 40 marks a metric ton, and the Australian, 30 marks. It is believed that this new coal can be laid down for about 16 marks. The coal discovery is considered the most important that has been made recently in the Andean countries.

Coal Dust Experiments

SPECIAL CORRESPONDENCE

Experiments with coal dust have been carried on for some time past at the Altoft colliery near Normanton, England, with the object of finding some means of preventing or mitigating explosions in collieries. An account of the plant used and of the methods employed was given in the JOURNAL a year ago (Oct. 24). During the last week a further demonstration was given to a large party of mining engineers and Government officials, when the beneficial effect of the use of stone dust was again shown.

The experimental gallery was filled throughout with coal dust and fired by a cannon, the result being a tremendous explosion extending the whole length of the gallery. On the second day stone dust was distributed over certain sections of the gallery and the coal dust again fired. Pieces of guncotton and cotton-wool fixed at short intervals showed that the flame only extended a short distance into the stone-dust sections. The stone dust used was prepared from a gray shale which had been ground to a rough powder.

ONE POUND OF COAL DUST GIVES OFF 43 CUBIC FEET OF GAS

The explosive character of coal dust is now generally accepted, but there are still some engineers who think that it is gas and not coal dust that is the cause of colliery explosions. The investigations that have been made at Altofts have demonstrated that 1 lb. of coal dust, when heated to 1650 deg. F. gives off 43 cu.ft. of gas, and this fact may play a considerable part in an explosion, although the origin of the explosion may be due to the ignition of coal dust.

With regard to the quantity of stone dust necessary to prevent an explosion, experiments have shown that an atmosphere containing 0.2 oz. of dust per cu.ft. is explosive, but that when the mixture contains 90 per cent. of coal dust and 10 per cent. of stone dust, there is no risk of an explosion. When the quantity of dust in the atmosphere is 0.4 oz. per cu.ft., a mixture of 80 per cent. coal dust and 20 per cent. stone dust is equally non-explosive. These figures are taken from the London *Times* report of Sept. 29.

The method of checking coal-dust explosions by the use of stone dust is known as the zone system, and is an alternative method to the watering method and to the use of salt or chloride of calcium. From the experiments conducted at Altofts it appears that the use of stone dust, while not freeing collieries from the danger of explosion, must go a long way toward localizing an explosion and toward preventing the whole mine being wrecked.

ALL METHODS FOR PREVENTING DUST EXPLOSIONS ARE STILL IN THE EXPERIMENTAL STAGE

The Royal Commission on mines whose second report was recently issued, and which was reviewed in the JOURNAL, went fully into the subject of the prevention of colliery explosions. The conclusion come to by the commissioners was that there was no method of prevention yet proposed that they could recommend for compulsory adoption. The method of complete watering practised in the Westphalian coalfield was open to objections and the zone method was in their opinion still too much in the experimental stage to allow of any definite recommendations being made.

Toward diminishing the risk of explosions, the commissioners thought that as regards Great Britain, there was room for improvement in ventilation and in inspection, or in what they called the "primary" methods of preventing dust explosions. Such explosions being, it is believed chiefly initiated by the ignition of explosive gas, the greater the care taken to prevent accumulation of gas, the less would be the risk of an explosion taking place.

Sulphur is being shipped to Europe from Los Cerritos, San Luis Potosi, Mexico. Other sulphur deposits are at Conejos, Durango, in Tamaulipas and in Lower California.

Mica is produced in small quantities in the State of Oaxaca, Mexico. Shipments have been made to England and the United States.

Mining Coal in the Philippine Islands

By Robert Hawxhurst, Jr.*

The island of Cebú in the Philippine archipelago, is situated about 300 miles southeast of Manila. The island is 120 miles long, with an average width of 23 miles. It is traversed from north to south by mountain ranges forming an island plateau, about 500 ft. in elevation. Cebú is the most densely populated island of the Philippine group, having an area of 1762 square miles and a population of 650,000.

Cebú City, the largest town, with 40,000 inhabitants, is possessed of an excellent harbor, formed by a widening of the straits between Mareta and Cebú islands. The harbor is easy of access and by reason of its almost complete protection from storms by the highlands of the two adjacent islands is considered to be the safest harbor in the group. By virtue of this harbor, Cebú controls the greater part of the trade of the southern Philippines. The hemp, sugar, tobacco and copra of Mindanao, Bohol, Samar and Seyte are brought to Cebú, in light-draft steamers; these products are then exported by direct lines of steamships to Hong Kong, Liverpool, Bremen and Hamburg.

The insular government has entered into a contract with the firm of J. G. White & Co. of New York for the construction of about 60 miles of broad-gage railway on Cebú. One section of this road will extend north, from Cebú City to the towns of Compostela and Danao. The coalfields in question are situated 20 miles to the northward of Cebú City, on the eastern slope of the coastal range of mountains, five or six miles west of the coast towns of Danao and Compostela, in a district of the same name. The elevation of the coal lands is from 600 to 800 ft., the surrounding hills rising about 1000 ft. higher.

From a hasty and somewhat incomplete examination, it would appear that these coal measures are of recent formation, probably of the Tertiary age, or later. From their outcrop on the western border of the field, the measures dip to the eastward with an inclination varying from 50 deg. to 70 deg.; the strike approximates N. E. and S. W.

A section embracing the successive formations from the basal sandstone to the argillaceous limestone caprock consists of limestone, slate, shale, and clay; the coal seams themselves are separated by strata of slates and clays, the whole resting in a transition bed of yellow clay that merges into ferruginous sandstone, the basal member of the measure.

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The Exposed Coal Seams

The coal beds are numerous but were not counted. The seams actually exposed by the workings are five in number, with a thickness of 0.8 m., 1.5 m., 1.6 m., 2.5 m. and 1.2 m. Besides these there exist numerous undeveloped seams of from 6 to 7 m. thick. The shales are of various kinds, bituminous, calcareous, argillaceous and arenaceous, and are permanent features of these measures; however, the coal itself as it occurs in the thicker seams is fairly clean and free from the slate and shale.

Numerous irregular isolated deposits of coal are reported just beyond the marginal area of the Danao and Compostela beds. These irregular coal beds usually occur in the banks of ravines and exhibit signs of disturbances. Although apparently unconnected with one another they bear the same general characteristics. It is probable that they are the remnants of some former field that has been removed by geologic agency. They have never been mined but have occasionally furnished a little coal for immediate local use.

The Danao and Compostela coal is probably a Tertiary lignite; its physical characteristics are as follows: Color, jet black; luster, resinous; streak, dark gray to black; ashes, light yellowish red to white; specific gravity, 1.32 to 1.34; contains a small amount of sulphur and does not slack upon exposure. The following comparative analyses were made in the laboratory of the insular mining bureau:

1. Coal from Esperanza mine, Compostela.

Specific gravity	1.329
Fixed carbon	51.96
Volatile matter	37.56
Water	7.80
Ashes	2.68 brick red in color
Flame	Long, reddish in color
Coke	Almost solid
Calorific value	7461

2. Coal from Caridad mine, Compostela.

Specific gravity	1.340
Fixed carbon	54.56
Volatile matter	34.33
Water	9.60
Ashes	1.31 clear red in color
Coke	Pulverized
Flame	Medium, reddish in color
Calorific value	7,012

3. Imported Australian coal, Sydney and Newcastle.

Specific gravity	1.365
Fixed carbon	71.45
Volatile matter	16.25
Water	2.90
Ashes	9.40 reddish gray
Flame	Long and brilliant
Coke	Swollen and brilliant
Calorific value	6,637

4. English Cardiff Coal.

Specific gravity	1.389
Fixed carbon	83.00
Volatile matter	8.60
Water	4.50
Ashes	3.90 gray in color
Flame	Short and dark
Coke	Almost pulverized
Calorific value	8,372

From these comparative analyses it would appear that the Danao and Compostela coals are essentially steam coals. While their calorific value falls below that of English Cardiff, it is superior in this respect to the Australian and Japan coals, upon which sources Philippine shipping and industrial enterprises rely for their fuel supply at present.

An analysis of average Japanese steam coal by Frank Brown, government chemist, Hong Kong, 1898, is as follows:

Fixed carbon	50
Volatile matter	40
Moisture	2 to 5
Ashes	3 to 5 to 20

Coal Was Discovered about 1860

These coal outcrops were discovered about 1860, and from 1870 down to the present time have been intermittently worked in a desultory fashion. No development work was done, the chief idea seemingly having been to mine and market a few tons of coal to cover current working expenses. However, it is doubtful whether the aggregate output during this entire period of working has reached 20,000 tons.

Two tramways were built; one from the Compostela group of mines to the coast town of Compostela, a distance of 15 km., and one from the Danao mines to a wharf at Danao. The idea seems to have been to ship from these two ports, but as they are open roadsteads, with neither protection nor depth of water, it is not clear how this method of exportation could have been pursued with any degree of success, had it ever been attempted upon a commercial scale. However, these tramways, through neglect, have fallen into a state of disrepair and ruin, a rather fortunate circumstance as regards the Compostela line at least, since its location, grade and curvature were such that its operation as a freight-handling proposition would prove an expensive luxury.

Many Difficulties Have Attended Mining

In spite of their present state of semi-abandonment, the Danao-Compostela mines are of great economic value, but the conditions of the past in the Philippine islands have been continuously unfavorable to their successful working. Mismanagement, ignorance of modern coal-mining practice, lack of sufficient capital, onerous government regulations, all played their parts in the undoing of the successive proprietors, while the unsettled conditions of the islands, due to revolts against Spanish rule, the Spanish-American war and the Philippine insurrections, have rendered it impossible to secure a satisfactory class of labor, and still more impossible to interest foreign capital in the development of the mines.

The climate of the island of Cebú is excellent, unskilled labor is plentiful, water sufficient for coal-washing purposes is at hand. The surrounding mountains furnish an abundant supply of light timbering material, while heavier sticks

may be readily obtained from the nearby island of Negros. A large local (insular) consumption and high prices (14 pesos per ton) await the Cebú coals.

Although the property at the present time may be called a mere prospect, and a thorough examination with surveys and borings is requisite to definitely determine the actual extent of these coal beds, still enough work has been done to make possible an approximate estimate of the coal tonnage. The total thickness of five seams exposed by the workings, is 7.15 m.; the lengths of the same, all comprised within the bounds of the property, is 14,000 m. Assuming a depth of 500 m., these seams would contain 52,800,000 cu.m., or upward of 60,000,000 tons. The assumption of a depth of 500 m. is perfectly logical in view of the formation. The minimum elevation of the outcrop is 200 m., which gives about 280 m. on the pitch, leaving about 200 m. of the assumed depth below sea level. The estimate of 60,000,000 tons applies only to the coal contained within the seams now opened; it is probable that future development will prove the existence of a tonnage greatly in excess of this amount.

Present Equipment Is Inadequate

The present workings and equipment of the mines, as before stated, are of practically no value to a scheme for their development along modern lines, and an estimate of the cost of modern equipment could, of course, be made, only after a more careful survey of the property and a knowledge as to the periodical production desired.

In any event, one considerable expenditure would be necessary, namely, the constructing of about 10 km. of aërial cableway or railway, from the Danao mines across the Mt. Licos ridge to the Compostela group. Neither of these improvements, however, presents any difficult or costly engineering features.

The cableway and railway would connect the mines with the Cebú Railway to Danao, which is to be completed within 18 months, thus giving a means of transportation of the product from the mine to wharves and bunkers at Cebú City. This latter town would be the port of exportation for the coals, to foreign ports of the Orient as well as to the adjacent islands of the Philippine group, where the consumption, already large, is soon to be increased with the completion of 700 miles of island railways, now contracted for by the insular government. The present price of coal in the islands ranges from 10 to 14 pesos per ton, and it is probable that the Danao-Compostela coals could be marketed at a profit, if the price obtained was only from 40 to 60 per cent. of these figures.

A shipment of nickel ore has recently been made from Tepic, Mex., to Europe.

Testing a Mine Fan

An interesting test was made recently on a 12-ft. 6-in. by 6-ft. double-inlet Clifford reversible fan. This ventilator was used as an exhaust and was run by an 18x18-in. single oil-splash engine. The test was made Aug. 29, 1909, at the Nottingham mine of the Pittsburg Coal Company. Practically all the officials of the Pittsburg Coal Company were present at the trial. The results of three tests are given in the accompanying table:

RECORD OF MINE FAN TESTS.

No. of Test.	Time of Test.	Rev. of Fan per Min.	M.E.P. Lb. per Sq.In. Steam.	Initial Steam Pres.	I.H.P. Engine.	Observed W.G. at Fan. (Inches).	Size of Airway at Fan. (Sq.Ft.)	Velocity of Air per Min. (Feet).	Volume of Air per Min. (Cu.Ft.)	Horsepower of Air.	Useful Effect. (Per Cent.)	Volume of Fan Wheel. (Cu.Ft.)	Volume per Revolution. (Cu.Ft.)	Volumetric Efficiency. (Per Cent.)	Peripheral Speed of Fan.	Diam. of Circ. Inlet, Ft.
1	11.30 to 11.35	150	20.3	95	69.6	2.65	52.3	1997	104,443	43.6	62.6	705.5	696.3	98.7	5890	79
2	11.45 to 11.50	175	29.3	95	117.0	3.78	52.3	2846	148,845	88.6	75.8	705.5	850.5	120.5	6872	79
3	12.00 to 12.05	200	38.6	95	164.5	4.70	52.3	3166	165,522	122.6	74.5	705.5	827.9	117.3	7854	79

Colliery Notes

The Sydney coalfield is the oldest worked in Canada. The existence of coal in the Sydney district was first recorded in 1672. When the foundation of Sydney was laid in 1784, coal mining was being carried on; however, it was not until after 1827 that the systematic and uninterrupted working of the Sydney coalfield commenced.

It should be remembered that although reciprocating plants cost more than high-speed centrifugal installations, the saving in the running cost will frequently pay back the difference in the initial expenditure, in a short period of time. The foundations for reciprocating plants have to be built stronger and consequently cost more than do foundations for centrifugal installations; however, reciprocating pumps do not depreciate as rapidly as centrifugal pumps, and the former have the additional advantages that they can always be brought back to their original efficiency.

If the cost of electric power is 1c. per unit of measure, then a difference of 1 per cent. in the efficiency of a 100-h.p. plant would mean about $60 per year. It is, therefore, evident that all mine operators who are attempting economy in operation should serve to attain the highest efficiency in their power plants. It is not unusual to find two plants operating under like conditions and in the same locality, and one plant having an efficiency 10 or 20 per cent. higher than the adjacent operation. From the foregoing figures, therefore, it is plain that a 20 per cent. difference in efficiency would amount to something like $100 per month, which item of unnecessary expense is not to be ignored by the most careless manager.

A careful record of the operations in sinking a shaft at a new coal mine, recently showed that the total amount of explosive used was 36,950 lb. of 50 per cent. powder. The total distance sunk was 2520 ft. The average weight of powder per foot sunk equaled 14.66 lb. The average number of holes was 12 holes in each sump and 6 holes in each bench, making a total of 24 holes per round. The average charge was equal to six sticks of 12-in. dynamite per 12-ft. hole. The number of cubic feet of muck per round of powder equaled 48 cu.ft. The quantity of solid per round of powder equaled 22 cu.ft. The amount of muck per foot sunk equaled 726 cu.ft. The total weight of water and muck hoisted out of the two shafts amounted to 101,105 tons. To mine and hoist this tonnage required 5730 tons of coal, or one ton of coal was equal to mining and raising 17.64 tons per hour, which was equivalent to 569 cubic feet.

The coal-mining industry in America, during the last five years has made rapid strides toward the adoption of precautions tending to provide greater safety for miners working underground. The question of naked lights underground, however, has not received the attention this important problem deserves. Practically all of the modern coal mines in Europe have adopted some type of safety lamp irrespective of whether or not the mine was known to contain explosive mine gases in dangerous quantities. American coal operators, backed up by American laws, take the stand that safety lamps should only be used in very gassy mines. The principal contention is that naked lights give greater illumination and enable the men to work better. With the present style of safety lamps, such an excuse is weak. Time will soon be when safety lamps will be used in all up-to-date coal mines, and this style of light will be adopted because it is the safest and eventually the cheapest.

The Pennsylvania Bureau of Industrial Statistics reports that in 1908 out of 137,648 persons employed in the bituminous coal mines of the State, 95,295 were of foreign birth. Of 134,992 employed in the anthracite mines 89,165 were foreigners.

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Illustrated.

The Tariff on Zinc and Antimony Ores

In referring last week to the situation in the zinc industry, we said that if zinc ore be smelted in bond, the smelter may liquidate by delivery of 90 per cent. of the metals. This is the present ruling of the Treasury Department, but we should have added that there is some doubt as to this matter because of confusion in the Payne tariff law. In schedules 173, 181 and 193, relating to antimony, lead and zinc respectively, provision is made for smelting in bond. In section 24, however, relating to bonded smelteries and refineries, although the general smelting of ores and refining of crude metals is specifically referred to in the first sentence of this section, the liquidation is specifically limited to lead. The use of the word "lead" instead of "metals" in this place may have been inadvertence; or it may have been a "joker"; or it may have been intentional. At all events, the Treasury Department has taken the position, pending a judicial construction of the law, that the whole of section 24 pertains only to lead ore, and that inasmuch as section 29 of the Dingley act provided for the smelting in bond of all metals, its provisions have not been repealed by section 24 of the Payne act except so far as they relate to lead. The Treasury Department has thus ruled that the duty on zinc ore smelted in bond may be liquidated by the delivery of 90 per cent. of the zinc and contents of the ore as shown by assay.

Over these sections of the Payne act there will doubtless be controversies that will have to be decided by the courts. The smelting of antimony, lead and zinc in bond was clearly contemplated in the schedules. Section 24 also authorizes the smelting in bond of ores and crude metals. It is a strain of the language to interpret this as meaning anything but *all* ores and crude metals. The first proviso of section 24 tells something else that may be done, namely that the charges against imports introduced into a bonded works "may be canceled upon the exportation or delivery to a bonded manufacturing warehouse * * * of the actual amount of *lead* (the italics are ours) produced from the smelting or refining, or both, of such ores or crude metals." The next proviso arranges for a similar cancelation in the event of withdrawal for consumption or export of the lead actually produced. Thus it would appear that, according to the strict letter of the law, a zinc smelter might, if he recovered some lead, say 10 lb., from the zinc ore imported, liquidate all import charges by delivery of the lead recovered, thus admitting the zinc content of the ore free of duty.

As the case stands on the face of the law it seems that the smelting in bond of antimony, lead and zinc is provided for in the schedules, the liquidation to be made as "provided by law." How the law provides for this is then set forth in section 24, which says that the liquidation may be made by delivery of the actual amount of lead produced. In the case of lead ore or lead bullion the produce that has heretofore been known as "exempt lead" is obviously excluded under the new law. The smelters and refiners of lead must now deliver the actual produce in order to secure liquidation. No specific provision is made for the liquidation of antimony and zinc imports that contain no lead, or are caused to yield no lead. As to this particular the Treasury Department may be able legally to refer back to the previous law and grant liquidation upon delivery of 90 per cent. of the metals, but all provisions of previous laws that are inconsistent with the Payne law were specifically repealed by section 41 of the latter, and an inconsistency would appear to exist with respect to section 24.

Nevada Consolidated Declares a Dividend

Nevada Consolidated last week declared a dividend of 37½c. per share, payable at the end of the present quarter. This company thus becomes the second of the porphyry mines to begin the payment of dividends, being preceded only by the Utah Copper Company.

It is interesting to note that Nevada Consolidated was first brought prominently to the attention of Eastern investors in the summer of 1905, and the production of blister copper was begun on July 9, 1908. This gives an idea of the length of time required to bring such an enterprise to the dividend-paying stage. However, it is to be remarked in this case that in the early days of this company developments were not pushed very rapidly. The mines had already been well opened by Bradley and Requa previous to the time when its stock was introduced in

the East by Hayden, Stone & Co. The construction of the reduction works was not begun until the early part of 1907, and during the 18 months of construction the panic of 1907 occurred.

In connection with the pending consolidation of Nevada Consolidated and Cumberland-Ely, it is interesting to quote Hayden, Stone & Co., of whom Mr. Hayden is one of the directors of Nevada Consolidated, in a recent circular of this firm, which says: "While there may be enthusiasts in each of these companies that think that the ratio of exchange was unfair to the respective company in which he is interested, the fact remains that after a thorough discussion of the subject from all standpoints by people who are able to look at the thing in a broad way, this vote was unanimous, and it seems to us that that should be a sufficient recommendation for the shareholders of one company to authorize it and of the other company to accept it. As the original sponsors for the Nevada Consolidated in the market, our sympathies and interests are identified almost entirely with the Nevada Consolidated, and we do not hesitate to advise the shareholders of that company to vote for the increase of stock to be thus used. At the same time we most emphatically state that we believe the Cumberland-Ely shareholders are to be more than congratulated upon their being in a position at the present time to obtain for their shares as attractive an offer as we feel that they have obtained in this transaction." These remarks lend point to what we said last week about this deal.

The Steel Corporation Statement

The statement of the United States Steel Corporation for the September quarter is altogether a favorable one. The net earnings for the quarter were $38,246,907, showing gains of $8,906,416 over the June quarter, and of $11,140,633 over the September quarter of 1908; while they were only $5,555,386 below the high level reached in the third quarter of 1907. The surplus over all charges for the quarter was $23,543,057, and this seemed to the management sufficient to warrant an increase of the common-stock dividend to 1 per cent. for the quarter, and also an appropriation of $10,000,000 for new construction work, the first for nearly two years. That is, the Steel Corporation is able to resume expenditures for the increase of its working plant, besides doubling the dividend paid on the common stock for several years. The first step is undoubtedly a wise one; as to the second, there may be differences of opinion, though the stockholders will be satisfied, and the stock will probably continue to rise in the market.

The statement of unfilled orders is also satisfactory showing a gain of 739,000 tons over June 30, and of 1,375,000 tons over a year ago. Considering the promptness with which it was possible to fill orders during the earlier part of the year, it is a sufficient guarantee of good business for half a year to come.

The Situation in the Coal and Coke Industries

During the last few months the coal and coke industries have been emerging slowly from the cloud of gloom that has for a long time surrounded them. The coke industry, because of the present great activity in the steel trade, is actually buoyant, and the production of coke is at the highest rate ever recorded, producers in some instances having been led to fire up old ovens that had been discarded. Some of the coking companies are out of the market, having sold their output for a year ahead, and prices are high, $2.90 being paid for furnace coke, and $3.50 for foundry coke.

It is really fortunate for the coke manufacturers that labor is already scarce, inasmuch as otherwise there might be no check to the present enthusiasm, and production might be pushed with such energy that the producers would be responsible for their own undoing, which has been the case in other periods of business recovery. It is to be hoped that conservatism will prevail and that the situation be handled with caution.

That present coke prices are already high is evident from a glance at the average prices prevailing in previous years. Pennsylvania produces more than 50 per cent. of all the coke manufactured in America, and may, therefore, be regarded as a good guide to the condition of the industry as a whole. The average prices per 2000 lb. at the ovens in previous years were as follows: In 1904, $1.68; in 1905, $2.05; in 1906, $2.35; in 1907, $2.55; in 1908, $2.10. Compared with previous years, therefore, the condition of the coke market at present is highly encouraging, but stability of prices will depend largely on the action of the manufacturers in refraining from over-production. The temptation to be greedy in the present good times, after the lean years that have been experienced, will be hard to resist.

The demand for coal has also increased materially during the last few months, and there is a similar tendency on the part of coal operators to strive individually to profit too largely from the betterment in trade by starting to make an output in excess of all previous records. The sure result of such a course will be to hold down the price. It may be remembered that the collieries of the United States can produce 1,000,000,000 tons annually, and that present consumption is not quite one-half that quantity. Over-production, therefore, is now, as in previous years, the great danger to be guarded against. A large output generally means a decrease in cost of production, and the temptation to ship a big tonnage is often too strong to be resisted. In many instances operators are now sending shipments forward on consignment, trusting that their agents will be able to find a place for the product. This condition is serving to keep prices down and it will probably continue so long as there is no organization of the bituminous industry. A coal producers' association, through which regular statistical reports of the situation in all the important markets could be obtained, might act to improve the stability of the coal-mining industry.

In reports concerning business in the daily papers and in many trade publications we find constant use of such expressions as "trade is approaching its normal condition," or "prices are at their normal level." If such statements are analyzed or are capable of analysis we will generally find that by "normal" is meant the condition of business or prices at the top of the latest boom. This it would seem is altogether a misuse of the word "normal," which has a certain good and definite signification. It is altogether out of place in this connection, however, for who is to determine what is the "normal" condition of business or the "normal" level of prices? Usually, we think, it is taken to mean a level where everybody is satisfied except the unfortunate ultimate consumer—and perhaps it is his normal condition to be dead broke.

Views, Suggestions and Experiences of Readers

Comments on Questions Arising in Technical Practice and Debatable Points Suggested by Articles in the Journal

CORRESPONDENCE AND DISCUSSION

Sulphuric Acid Lead Chamber Construction

The new sulphuric-acid chamber construction of Frederick J. Falding, published in the JOURNAL of Sept. 4, 1909, is decidedly a novelty and will evoke a little revolution in that industry. Hitherto, it has not been attempted to carry the process completely to the end in one chamber, but always a little auxiliary chamber, or at least a reaction tower, has been employed to work off the last remnants of the SO_2 gases. In recent times, the practice has been to build the chambers increasingly high and narrow, since it had become known that such chambers give better results.

Mr. Falding deserves credit for having gone the farthest in this direction; properly, his chamber must be called a "tower." According to his plan, these peculiar dimensions now lead to a finish of the reaction inside the chamber. This fact further shows that the prescribed path of the gases through the structure is correctly calculated. It is also notable that the difference of temperature between the roof and bottom is comparatively small, and therefore, that the reaction goes almost to the bottom and yet quantitively comes to an end.

Through the long path down from the top, in the comparatively small space, a continuous mixture of the gases is attained, or rather their separation is hindered; the movement is intense and constant; dead spaces do not exist; and, therefore, the reaction cannot come to a standstill, but goes on with almost unchanged intensity to the end. The Meyer tangential chambers are indeed similarly conceived and operate upon a like principle, yet there it is not proposed to bring the reaction to an end in one chamber, and with equal intensity of production, this would not be possible. It is especially interesting that Falding with his chamber undertook to use up effectively the copper-smelting furnace gases containing CO_2. Hitherto in the few cases where gases containing CO_2 had to be dealt with, as for example, in the use of colliery pyrites, great difficulties have always been encountered through the presence of the CO_2, and I know of still another case in the use of crude brimstone containing bitumen. If now, Falding has succeeded in using up the sulphur gases under such circumstances, this indicates that the gas movement in his chamber is extremely intense and that the CO_2 cannot collect by itself and cripple the process, but will simply be drawn along as an inert gas like nitrogen. Therein lies the best proof that his construction is excellently adapted to the use of the chamber process.

I believe that the chief value of this new construction lies in the hight with small cross-section. The other advantages—saving of space and installation costs—I can admit only for the chamber itself, not for the entire system. According to Falding's plan, he builds the chamber of 5000 cu.m., with a complete auxiliary equipment for each individual chamber. Thus the saving in cost of construction for the chamber would be offset by increased costs for the auxiliary apparatus. Still, the chambers are built as large as possible, and the other parts of the system thus stand as cheaper. When this construction is most advantageously employed several chambers must be connected behind each other, or near each other. The latter plan, especially, recommends itself, since thus the operation can be forced at will. For this form the cost of auxiliary apparatus would be much reduced and in such cases the cost of the entire system would be considerably less than for others.

The Falding single-chamber system requires more service for raising acid, etc., and correspondingly more repairs. A plant like the 1000-ton works in Tennessee must then have 25 systems, each with its own acid hoist and control. That, however, is going too far and nowhere except in this case is such centralization desirable. Falding draws conclusions from a few data over only a short period. It would be interesting to obtain data covering a period of great activity and giving the output and saltpeter consumption during this time. Some information as to the temperature at the roof of the chamber would also be important.

The production of the chamber is moreover not greater than that of other intensive systems; it amounts to 0.4274 to 0.4709 cu.m. per kilogram of sulphur; today, perhaps, it reaches 0.36. The saltpeter consumption is not particularly low, although it does not exceed a fair average. That, indeed, is principally attributable to the small Glover and to the warm gases at entrance to the Gay-Lussac.

Falding, in his examples, mentioned a sulphur deposit. I assume that this refers to raw sulphur. In this case, however, the gases with 7.9 and 8.1 per cent. are not strong enough. The gases of raw sulphur must have 10 to 11 per cent. of SO_2 if everything is to go right. If, therefore, this defect be remedied, I am sure that the results will be improved. In any event, Falding's invention is one of the most interesting and important for sulphuric-acid manufacture in chambers and its further development should be carefully noted. One wishes, however, that the various data, such as gas pressure, temperatures, etc., might be made known.

JOSÉ SAUERSCHNIG.

Mexico, D. F., Oct. 2, 1909.

Ely Central Copper Company

I beg to express my appreciation of the remarks concerning this company in the JOURNAL of Oct. 9. This company was originally brought out by O. A. Turner, who paid $280,000 for the property. Immediately following its organization the company drilled six holes from 100 to 400 ft. deep, all of which showed rhyolite only. Partly as the result of this prospecting and partly from the study of other conditions, engineering and geological opinion generally became adverse to this property, except possibly the extreme west end of the tract, which may have a little piece of the Eureka orebody.

The capital stock of the company was originally 1,200,000 shares of $10 each, of which 900,000 shares were retained by the vendors and 300,000 shares were held in the treasury for the purpose of raising funds. Recently a block of the treasury stock (75,000 shares) was contracted at 50c. per share to one George Graham Rice. He also obtained options on some other stock at 37½@75c. per share. The purpose of the present advertising and curb-market campaign is to sell this stock. Another person associated with this campaign appears to be Nat. Goodwin, the actor, whose claim to fame in mining finance is based upon Rawhide Coalition.

Out of the comparatively small portion of the proceeds of the stock sales that go into the treasury of the company, some development work is being done, wherefore the company is at least doing something. A shaft is being sunk near the boundary line of the Eureka (Copper Flat) property of the Nevada Consolidated, and it may encounter a fringe of that orebody, but even so, this will be far from insuring any great productive capacity to the Ely Central Copper Company, the bulk of whose area has not yet been proved to be mineral-bearing.

ENGINEER.

New York, Oct. 24, 1909.

Details of Practical Mining

Notes of Interest to the Operators of Small Mines as Well as of Large Mines. The Things That Have to Be Done in Everyday Mining

REPORTS FROM EXPERIENCE

Readers of the JOURNAL are invited to contribute to this department. Articles should be brief, thoroughly practical, and preferably illustrated by drawings or sketches. Our draftsmen will prepare properly any kind of a pencil sketch that is intelligible. Something that is an old story in one district may be quite unknown in another. Articles accepted and published are suitably paid for.

A Movable Sorting Floor Grizzly

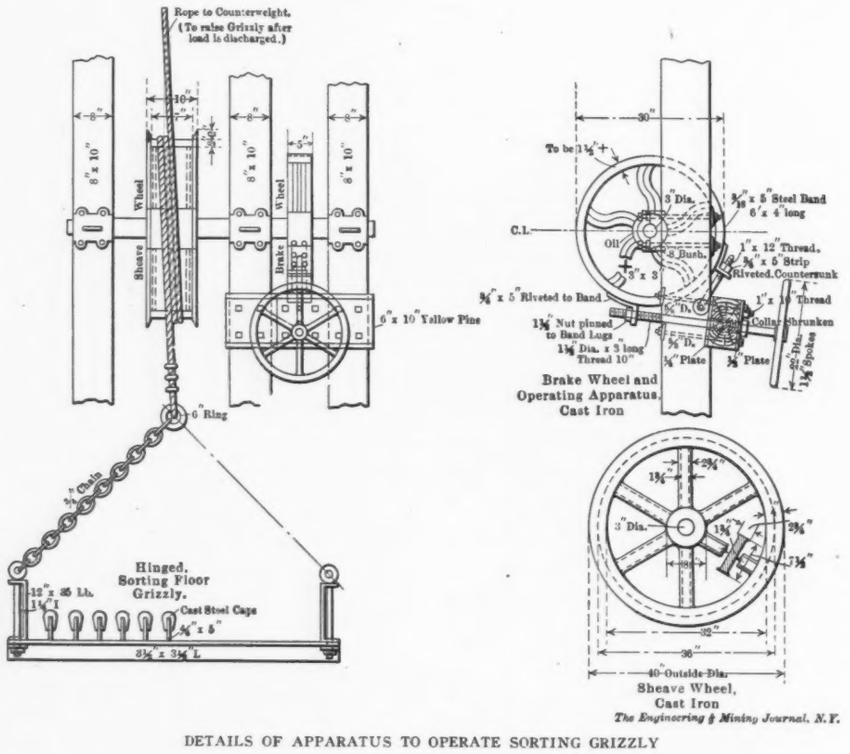
BY GUY C. STOLTZ*

A sorting-floor grizzly of the following description is used in the several head frames on the Port Henry Iron Ore Company's property at Mineville, N. Y. It is the intermediate one of three grizzlies and provides hand sorting for the lump magnetite ore before it is delivered into storage bins.

The grizzly is 11 ft. long, 6 ft. wide, and provided with steel-plate side boards 18 in. high. It will receive two dumps from a 4-ton skip. When receiving a dump the grizzly is in a horizontal position, thus enabling a man to look over the material thoroughly, pick out all large pieces of rock and drop them into a nearby chute delivering to a rock-storage bin. After two skip loads have been sorted the grizzly is lowered (about 35 deg. to dump on the next grizzly) by releasing a band brake operating on a wheel keyed to a line of shaft on which is also mounted a sheave wheel, which wheel in turn receives several winds of a 1⅛-in. cable leading from the front of the hinged grizzly to a counterweight hung in the frame.

The counterweight is heavy enough to just raise the empty grizzly back to its horizontal position. The band brake is then made tight and grizzly is held in position until it has received another two dumps. The band brake must needs be released slowly to prevent the grizzly from receiving racking jars on dumping its load.

From a point of economy a sorting floor operated in this manner has an advantage over one operated by an air hoist and again the simple device will work at all times, while in winter the air hoist frequently freezes up and gives trouble.

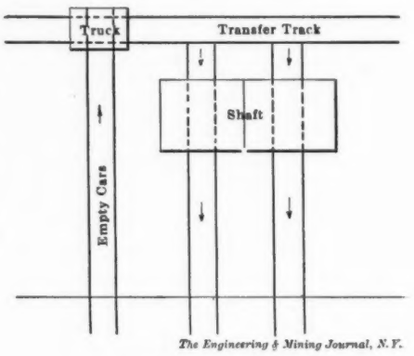

Rope to Counterweight. (To raise Grizzly after load is discharged.)
Wheel
Sheave
Brake
6" x 10" Yellow Pine
6" Ring
Hinged, Sorting Floor Grizzly.
Cast Steel Caps
Brake Wheel and Operating Apparatus. Cast Iron
Sheave Wheel, Cast Iron
The Engineering & Mining Journal, N.Y.

DETAILS OF APPARATUS TO OPERATE SORTING GRIZZLY

*Mining engineer, Mineville, N. Y.

Car Transfer

The use of a car transfer is often advantageous, and especially on trestles, headframes, or in a mine where space for extra track is limited. The accompanying sketch shows the arrangement as used at Ishpeming, Mich. The truck used is the same as the ordinary car. The essential feature is a substantial platform about 4 ft. wide by 5 ft. long, with a track to receive the car. The top of the truck, of course, should be level with the main track; this necessitates sinking the transfer track 15 to 18 in. The cars are run on to the truck and then shifted to the track which leads to the cage.



CAR TRANSFER

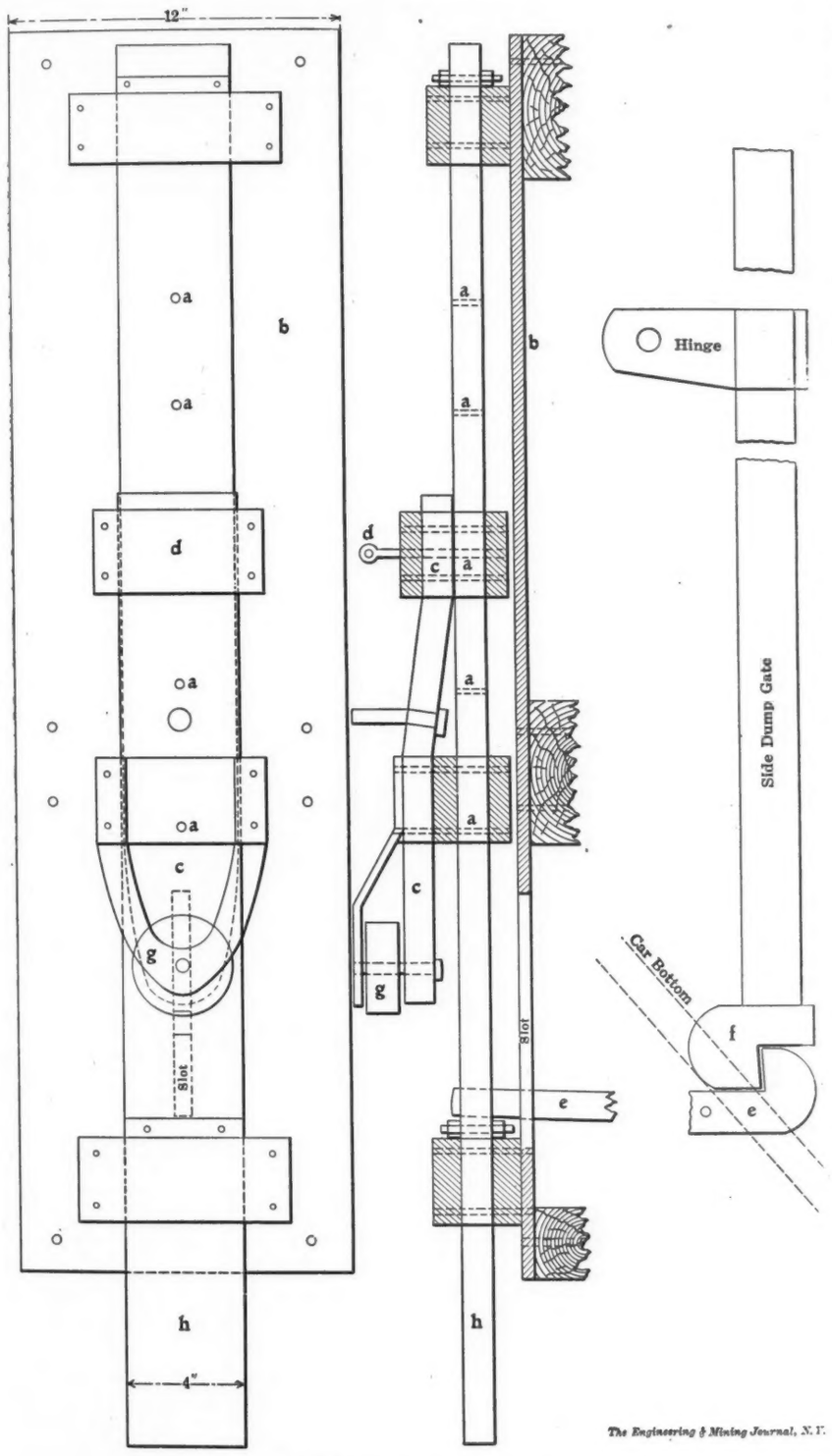
Automatic Trip for Side Dump Car

Tail rope haulage is used by the Penn Iron Company, Vulcan, Michigan. The car is of the side-dump type with a double truck. The car weighs 6500 lb. and carries 3½ tons of ore. With this car it is possible to dump ore in five different bins. The dumping arrangement is on the opposite side from the gate as shown in the accompanying illustration. This device is bolted to the car and is connected with the gate by a lever *c* which engages the catch *f*. The wheel *g* is attached to a movable part *c*, and by means of a pin *d*, *c* may be set at any desired position on the bar *h*. The holes *a* are 5 in. apart; *i* is a small handle by which to lift the part *c* when changing the position of the dumping wheel. At each bin is a jack which the wheel *g* strikes and as the wheel passes over the jack it raises the bar *h*,

which in turn lifts the end of the lever *e*. These jacks are set by the side of the track with the lowest one nearest the shaft, while the highest one is at the farthest end of the track. The haulage distance in about 500 ft. An electric motor is used to drive the rope-haulage system. It requires one man at the motor and one man to attend the loading of the cars.

A Movable Ore Chute

At the Chapin mine, Iron Mountain, Mich., there are three classes of ore to be handled from one shaft, as well as an occasional shipload of waste rock. To provide for this there are four bins in front of the shaft, but the two skips cannot dump into all four of the bins. This difficulty is overcome by means of a movable side-dump car, which is used as a chute. This car is operated by a tail-rope cable on a small winding drum. The man who loads the ore at the bottom of the shaft signals to the surface the class of ore to be hoisted. The man in charge of the air hoist sets his car to receive the ore direct from the skip. As soon as the skip dumps, the car is moved to the proper bin and dumped by the tender.

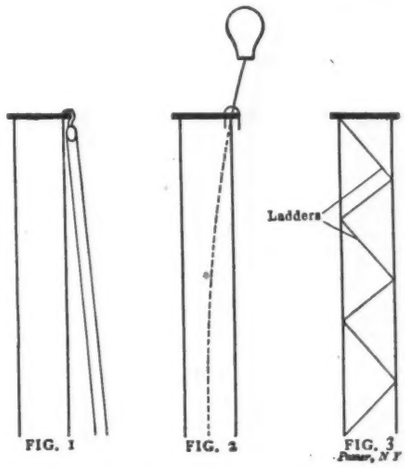


AUTOMATIC TRIP FOR ORE CAR

Painting Power Plant Stacks

A correspondent of *Power and the Engineer,* says:

A short time ago we got tackle and material ready to paint the stacks of the power plant; but when we came to hoist the tackle by means of the small cables (Fig. 1) with which each stack was equipped, they were found to be broken and useless.



SCHEMES FOR HOISTING TACKLE IN STACK

We procured some paper balloons and sent them up inside the stack (Fig. 2) with a cord attached, intending to pull up a small rope, and then a wire cable. Everything worked nicely until we began pulling the string. It caught on a ragged edge on the top and refused to go farther. Several attempts were made, but always with the same result. The string method was a failure.

The stacks are 116 ft. high and 5 ft. in diameter. We were not in a mood to give up, and the job was shortly accomplished by building 19 ladders each 8 ft. long, the longest we could take in at the base of the stack. These ladders were built to fit together at the proper angle and set up inside the stack, as shown in Fig. 3. New cables were placed in the sheaves at the top and the painting was soon in progress.

The Broken Hill Proprietary Company is experimenting with a Calyx drill for boring 12-in. holes for ventilation and for passes for filling with tailings.

Patents Relating To Mining and Metallurgy

A Selected and Classified List of New Inventions Described during the Past Month in the Publications of the Patent Offices

UNITED STATES AND BRITISH PATENTS

A copy of the specifications of any of these patents issued by the United States Patent Office will be mailed by THE ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. British patents are supplied at 40 cents. In ordering specifications, correspondents are requested to give the number, name of inventor and date of issue.

ALUMINUM.

FUSIBLE COMPOUNDS AND RECOVERY THEREFROM—Improvements in Methods of Making Fusible Compounds of Aluminum and Recovering Aluminum Therefrom. L. R. Keogh and C. A. Douglas, Ottawa, Canada. (Brit. No. 18,356 of 1909.)

SOLDER FOR ALUMINUM. Jacques F. Guggenbuhl, Paris, France. (U. S., No. 933,433, Sept. 7, 1909.)

BORAX.

PRODUCTION—A Process for the Production of Borax from Native Compounds of Boron. G. E. Bailey and Archie Stevenson, Los Angeles, Cal. (Brit. No. 794 of 1909.)

CEMENT.

PORTLAND CEMENT—Method of Making Portland Cement. Joseph M. Carrère, Allentown, Penn., assignor to Blanc Stainless Cement Company, Allentown, Penn., a Corporation of New Jersey. (U. S. No. 932,374, Aug. 24, 1909.)

SLAG CEMENT—Improvements in the Manufacture of Slag Cement. John G. A. Rhodin, Liverpool, Eng. (Brit. No. 23,988 of 1908.)

COAL AND COKE.

COAL CUTTING—Improvements in Cutter Chains for Mining Machines. John Liddle, Glasgow, Scotland. (Brit. No. 10,045 of 1909.)

COAL-SEPARATOR. Nelson Mowery, Wilkes-Barre, Penn. (U. S. No. 936,015, Oct. 5, 1909.)

COAL-WASHER. Freeman R. Willson, Jr., Worthington, Ohio, assignor, by mesne assignments, to The Jeffrey Manufacturing Company, a Corporation of Ohio. (U. S. No. 933,808, Sept. 14, 1909.)

COKE—Apparatus for Drawing Coke. Eldred D. Ratliff, Birmingham Ala. (U. S. No. 934,215, Sept. 14, 1909.)

COKE MANUFACTURE—Improvements Relating to Mechanism for Levelling the Charge in Coke Ovens and Furnaces. Franz Meguin and Company, Ltd. and Wilhelm Muller, Dellingen-Saar, Germany. (Brit. No. 8035 of 1909.)

COKE OVENS—A Method of Preserving Coke-Oven Walls. Heinrich Koppers, Essen-Ruhr, Germany. (Brit. No. 4792 of 1909.)

COKE OVENS—Improvements in or Relating to Regenerative Coke Ovens. Actien Gesellschaft für Kohlendestillation, Gelsenkirchen-Bulmke, Westphalia. (Brit. No. 19,264 of 1909.)

COKE OVENS—Improvements in Regenerative and Non-regenerative Coke Ovens. R. F. F. Fabry, Chesterfield, England. (Brit. No. 8920 of 1909.)

COKING-OVEN. Samuel B. Sheldon, Buffalo, N. Y. (U. S. No. 933,349, Sept. 7, 1909.)

MINING METHOD—Method of Mining Coal. David P. Loomis, New Philadelphia, Ohio, assignor of one-half to Joseph A. Beidler, Cleveland, Ohio. (U. S. No. 935,762, Oct. 5, 1909.)

PEAT—Apparatus for Producing Fuel and Gas from Peat. Wilbur L. Shepard, Elmwood, Conn., assignor of one-half to Horace J. Wickham, Manchester, Conn. (U. S. No. 936,049, Oct. 5, 1909.)

SAFETY APPLIANCE for Colliery and Other Inclines. John Norton, Wigan, England. (U. S. No. 931,078, Aug. 17, 1909.)

COPPER.

ALLOY and Process for Its Production. Auguste J. Rossi, New York, N. Y., assignor to Titanium Alloy Manufacturing Company, New York, N. Y., a Corporation of Maine. (U. S. No. 935,863, Oct. 5, 1909.)

RECCVERY FROM RESIDUES—Process for the Recovery of Copper from Cuprous Residues. Dominic Crispo, Antwerp, Belgium. (U. S. No. 936,762, Oct. 12, 1909.)

REFINING—Apparatus for Refining Copper. Frank L. Antisell, New York, N. Y., assignor of one-fourth to William S. Higgins, Perth Amboy, N. J. (U. S. No. 13,020, reissue, Sept. 14, 1909.)

GOLD AND SILVER.

AMALGAMATING—Apparatus for Pulverizing and Amalgamating Ores. Royer Luckenbach, Colwyn, Penn., assignor to Borindum Extraction Company, a Corporation of Arizona. (U. S. No. 936,645, Oct. 12, 1909.)

AMALGAMATING—Process of Amalgamating and Separating Metallic Ores. Royer Luckenbach, Colwyn, Penn., assignor to Borindum Extraction Company, a Corporation of Arizona. (U. S. No. 937,033, Oct. 12, 1909.)

DREDGING—Collecting Means for Gold-Dredges. Thomas J. Barbour, San Francisco, Cal. (U. S. No. 936,754, Oct. 12, 1909.)

EXTRACTION—Improvements in Extracting Gold and Silver from Crushed Ore and Ore Slimes and Means Therefor. Andrew E. Crosse, Hyde Park, London, Eng. (Brit. No. 269 of 1909.)

EXTRACTION—Process of Extracting Precious Metals from Ores. Isidor Kitsee, Philadelphia, Penn. (U. S. No. 936,545, Oct. 12, 1909.)

FILTERING APPARATUS—Improvements in Filtering Apparatus for Use in Connection with the Washing of Slimes and for Other Similar Purposes. John F. Webb, Battersea, and Percy Tarbutt, London. (Brit No. 21,474 of 1908.)

GOLD-SAVING APPARATUS. Victor P. Yelmini, Alameda, Cal. (U. S. No. 932,936, August 31, 1909.)

GOLD-SEPARATING APPARATUS. John D. Luttrell, Benton Harbor, Mich. (U. S. No. 933,772, Sept. 14, 1909.)

GRINDING-PAN—William Middleton and Hervic N. G. Cobbe, Kalgoorlie, Western Australia, Australia. (U. S. No. 936,794, Oct. 12, 1909.)

IRON AND STEEL.

BESSEMER CONVERTER. Guy J. Stock, Darlington, England. (U. S. No. 935,615, Sept. 28, 1909.)

BESSEMER CONVERTERS—Improvement in Connection with Bessemer Converters. Guy J. Stock, Darlington. (Brit. No. 12,212 of 1908.)

BLAST-FURNACE. Edward B. Cook, Pottstown, Penn. (U. S. No. 936,308, Oct. 12, 1909.)

BLAST FURNACE OPERATION—Method of Operating Blast-Furnaces and Converters. James Gayley, New York, N. Y. (U. S. No. 935,628, Sept. 28, 1909.)

CASTINGS—Manufacture of Steel Castings. Jacob K. Griffith, Latrobe, Penn. (U. S. No. 936,623, Oct. 12, 1909.)

ELECTRIC FURNACE—Improvements Relating to Electric Induction Furnaces. Rochlingsche Eisen- und Stahl-werke Gesellschaft and Wilhelm Rodenbauser, Volklingen on Saar, Germany. (Brit. No. 18,513 of 1908.)

INGOTS—Method for Making Sound Metal Ingots and Other Castings. Robert A. Hadfield, Sheffield, England. (U. S. No. 933,751, Sept. 14, 1909.)

NICKEL-STEEL SCRAP—Process of Recovering Nickel-Steel Scrap. Ralph H. Watson, Munhall, Penn. (U. S. No. 934,864, Sept. 21, 1909.)

REMOVING SALAMANDERS—Method of Disintegrating and Removing Annular Salamanders in Nodulizing-Kilns. August Bräutigam, South Orange, N. J., assignor to August Heckscher, New York, N. Y. (U. S. No. 936,981, Oct 12, 1909.)

STEEL PLANT. John C. Cromwell and Horace W. Lash, Cleveland, Ohio, assignors to The Garrett-Cromwell Engineering Company, Cleveland, Ohio, a Corporation of Ohio. (U. S. No. 935,964, Oct. 5, 1909.)

LITHIA.

MANUFACTURE of Pure Lithium Compounds. Erland Zell, Gottenborg, Sweden, assignor to General Electric Company, a Corporation of New York. (U. S. No. 935,880, Oct. 5, 1909.)

MAGNESIUM.

ELECTROLYTIC PRODUCTION of Magnesium. Franz von Kügelgen, Holcombs Rock, Va., and George O. Seward, East Orange, N. J., assignors to Virginia Laboratory Company, New York, N. Y., a Corporation of New York. (U. S. No. 935,796, Oct. 5, 1909.)

NICKEL.

NICKEL ALLOYS—Method of Manufacturing Nickel and Nickel-Copper Alloys. David H. Browne, Copper Cliff, Ontario, Canada, assignor to The Canadian Copper Company, Cleveland, Ohio, a Corporation of Ohio. (U. S. No. 934,278, Sept. 14, 1909.)

SALT.

MANUFACTURE of Salt. Balfour F. McTear, Lea Green, via Rainhill, England. (U S. No. 933,572, Sept. 7, 1909.)

ZINC.

CONDENSER—Metallurgical Condenser. Woolsey M. Johnson, La Harpe, Kans., assignor to The Continuous Zinc Furnace Company, Hartford, Conn., a Corporation of Connecticut. (U. S No. 933,843, Sept. 14, 1909.)

ELECTROLYTIC WINNING of Zinc from Solutions of Zinc Sulphate. Victor Engelhardt and Max Huth, Charlottenburg, Germany, assignors to Siemens & Halske, Aktiengesellschaft, Berlin, Germany, a Corporation of Germany. (U. S No. 935,250, Sept. 28, 1909.)

PROCESS OF TREATING ZINC. Salomon Frank, Frankfort-on-the-Main, Germany. (U. S. No. 935,900, Oct. 5, 1909.)

RETORT FILLING—Apparatus for Filling Zinc-Retorts with Granular Material. John D. James, Pulaski, Va. (U. S. No. 936,245, Oct. 5, 1909.)

MINING—GENERAL.

EXPLOSIVES—Device for Detecting Decomposition of Explosives. Edouard Bouchaud-Praceig, Paris, France. (U. S. No. 934,500, Sept. 21, 1909.)

SHAFT SINKING—Sinking Shafts and the Like. Daniel E. Moran, Mendham, N. J., and John W. Doty and Edwin S. Jarrett, New York, N. Y. (U. S. No. 933,776, Sept. 14, 1909.)

VENTILATING—Improvements in Ventilating System for Mines. John Quin, Houtzdale, Penn. (Brit. No. 6006 of 1909.)

WOOD PRESERVATION—Liquor for Impregnating Wood. Karl H. Wolman, Idaweiche, near Oppeln, Germany, assignor to Max Barschall, New York, N. Y. (U. S. No. 936,070, Oct. 5, 1909.)

WOOD PRESERVATION—Process of Preserving Wood. John M. Nelson, Jr., Sher-

wood, Md. (U. S. No. 937,008, Oct. 12, 1909.)

ORE DRESSING—GENERAL.

CENTRIFUGAL CONCENTRATOR and Classifier. Frederick Laist, Anaconda, Mont., assignor of one-half to Oscar Max Kuchs, Anaconda, Mont. (U. S. No. 935,311, Sept. 28, 1909.)

CONCENTRATOR—Apparatus for Concentrating. George F. Rendall, New York, N. Y., assignor to American Reduction Company, a Corporation of New Jersey. (U. S. No. 936,563, Oct. 12, 1909.)

CRUSHING—Improvements in Crushing, Pulverizing and the Like Machines. Edgar Allen & Co., Ltd., Imperial Steel Works, Sheffield, Eng. (Brit. No. 26,464 of 1908.)

CRUSHING—Improvements in Means for Crushing or Grinding Rocks, Ores of the Like Substances. Anthony M. Robeson, London, England. (Brit. No. 17,213 of 1908.)

ORE-CRUSHER. Charles O. Michaelsen, Omaha, Neb. (U. S. No. 931,210, Aug. 17, 1909.)

ORE-CRUSHER—Eccentric Ore-Crusher. Smith Abernathy, Ponoka, Ala. (U. S. No. 935,630, Oct. 5, 1909.)

SCREEN—Ore-Screen. Archie B. Meiklejohn and Jessie R. Villars, Butte, Mont. (U. S. No. 935,216, Sept. 28, 1909.)

SCREENING, ETC.—Apparatus for Screening, Sizing, and Classifying Granular Materials. Charles A. Pringle, Chihuahua, Mexico, assignor to Calera Mining Company, a Corporation of New Jersey. (U. S. No. 936,162, Oct. 5, 1909.)

STAMP-MILL. Oliver C. Purkeypile, Ashland, Ore. (U. S. No. 934,354, Sept. 14, 1909.)

METALLURGY—GENERAL.

FURNACE CHARGES—Improved Means for Calculating or Estimating the Amount of Constituents of the Charges of Smelting Furnaces and the Like. Robert Marshall, London, England. (Brit. No. 23,981 of 1909.)

MELTING—Improvements in Apparatus for Melting Metal, Casting it Into Ingots and Cooling the Latter. Robert T. Johnston, Scotch Plains, N. J. (Brit. No. 14,959 of 1908.)

REDUCTION—Metallurgical Process. Oliver B. Dawson, El Paso, Tex., assignor to American Reduction & Refining Company, New York, N. Y., a Corporation of South Dakota. (U. S. No. 936,095, Oct. 5, 1909.)

REDUCTION PROCESS—Method of Reducing Ores. Karl A. F. Hiorth, Christiania, Norway. (U. S No. 934,170, Sept. 14, 1909.)

SEPARATION—Wet Method of Separating Metallic Compounds. John H. Thwaites, Peterborough, England. (U. S No. 935,337, Sept. 28, 1909.)

SLAG—Improved Process and Apparatus for Granulating Slag. "Pyrotrass," Société Anonyme pour la Fabrication du Trass Artificial (Brevete) et Ses Applications Industrielles, Paris, France. (Brit. No. 2849 of 1909.)

SLAGS—Process of Deoxidizing Slags. Otto Thallner, Bismarckhütte, Germany, assignor to The Firm of Bismarckhütte, Germany. (U. S. No. 936,382, Oct. 12, 1909.)

SMELTER SMOKE—Device for Preventing Waste of Minerals. Michael J. Smith and Martin O. Kongsli, Tacoma, Wash. (U. S. No. 936,377, Oct. 12, 1909.)

SMELTING — Process for Smelting Ore. Joseph P. Welch, Salt Lake City, Utah, assignor of one-half to Jay J. Snider, Salt Lake City, Utah. (U. S. No. 937,031, Oct. 12, 1909.)

SULPHUR DIOXIDE FROM GASES—Improvements in the Removal of Sulphur Dioxide from Gases and its Recovery as Sulphuric Acid. Hans Kuhne, Goslar, Germany. (Brit. No. 17,520 of 1908.)

SULPHIDE ORE TREATMENT—Process of Oxidizing Ores. Byron E. Eldred, Bronxville, N. Y., assignor to Combustion Utilities Company, New York, N. Y. (U. S. No. 932,689, August 31, 1909.)

WELDING—Process of Welding Metals. Hans Goldschmidt, Essen-on-the Ruhr, Germany, assignor, by mesne assignments, to Goldschmidt Thermit Co., New York, N. Y., a corporation of New York. (U. S. No. 13,010, reissue, Aug. 17, 1909.)

MINING MACHINERY AND APPARATUS.

BLASTING—Mine-Firing Device. Thomas C. Hallam, Gardner, Ill. (U. S. No. 936,885, Oct. 12, 1909.)

COUPLING FOR DRILL-STEELS. Charles C. Hansen, Easton, Penn., assignor to Ingersoll-Rand Company, New York, N. Y., a Corporation of New Jersey. (U. S. No. 934,069, Sept. 14, 1909.)

DREDGERS—Tooth for Steam Dredgers, Excavators, &c. Charles E. Gardner, Unionville, Va. (U. S. No. 935,147, Sept. 28, 1909.)

DRILL—Mining-Drill. Joseph R. Place, Chicago Heights, Ill. (U. S. No. 936,937, Oct. 12, 1909.)

ELECTRIC DRILL—William O. Duntley, Chicago, Ill., and Henry J. Kimman, Cleveland, Ohio, assignors, by direct and mesne assignments, to Chicago Pneumatic Tool Company, Chicago, Ill., a Corporation of New Jersey. (U. S. No. 936,870, Oct. 12, 1909.)

HOISTING—An Improved Safety Apparatus for Lifts, Hoists or the Like. J. G. Childs and Thomas S. Hill, London, Eng. (Brit. No. 15,935 of 1908.)

HOISTING—Improvements in Safety Hooks for Lifting, Lowering, Hauling and Like Tackle. F. J. Plater, Durham, England. (Brit. No. 22,619 of 1908.)

HOISTING—Improvements in or Relating to Safety Suspending Apparatus for Mine Cages and the Like. William Francis and Alfred Sedgwick, Derby. (Brit. No. 20,501 of 1908.)

HOISTING — Improvements Relating to Safety Catches for Suspended Lift-Cages. F. Weidig, Alfeld, Germany. (Brit. No. 11,447 of 1909.)

HOISTING—Safety Attachment for Mine-Elevators. Morgan E. Jolliffe, Uniontown, Penn., and John H. Cowan, Jefferson, Ohio. (U. S. No. 934,816, Sept. 21, 1909.)

LAMP—Miner's Lamp. Adletia M. Van Liew, Houghton, Mich., assignor of one-half to John Van Liew, Houghton, Mich. (U. S. No. 934,243, Sept. 14, 1909.)

MINER'S CAP. Ida M. McPherson, Yatesboro, Penn. (U. S. No. 931,463, August 17, 1909.)

MINER'S LAMP. Otto M. Müller, Gelsenkirchen, Germany. (U. S. No. 935,219, Sept. 28, 1909.)

RESPIRATORY APPARATUS. Jules Tissot, Paris, France. (U. S. No. 932,515, Aug. 31, 1909.)

ROCK-BREAKER. Charles C. Lane, Los Angeles, Cal. (U. S. No. 936,729, Oct. 12, 1909.)

ROCK-DRILL. Robert A. Fowden, Germantown, Penn., assignor to United States Electric Rock Drill Company, Dover, Del., a Corporation of Delaware. (U. S. No. 933,702, Sept. 7, 1909.)

ROCK-DRILL. William L. Smith, Columbus, Ohio, assignor, by mesne assignments, to Jeffrey Manufacturing Company, a Corporation of Ohio. (U. S. No. 934,102, Sept. 14, 1909.)

ROCK DRILLING—Improvements in and Relating to Water Feed Devices for Rock Drills and the Like. Heinrich Flottmann, Cardiff, Wales. (Brit. No. 6668 of 1909.)

ROCK DRILLS—Improvements in Rock Drills. Karl Ruschenbaum, Jeppestown, Transvaal. (Brit. No. 16,771 of 1908.)

SAFETY LAMPS—An Improved Apparatus for Electrically Igniting Miners' Safety Lamps in Mines. John C. Best, Morley, Eng. (Brit. No. 10,838 of 1908.)

SAFETY LAMPS—Ignition Device for Miner's Safety Lamps. Ferdinand A. Wicke, Barmen, Germany. (Brit. No. 9662 of 1908.)

SAFETY LAMPS—Improvements in or Relating to Miners' Safety and Other Lamps. Ernest A. Hailwood, Morley, Eng. (Brit. No. 23,096 of 1908.)

METALLURGICAL MACHINERY AND APPARATUS.

DOORS FOR RETORTS, ETC.—Improvements in Doors for Retorts, Coke Ovens and Other Furnaces. F. Shaw, T. M. Percy, and J. K. Entwistle, Wigan. (Brit. No. 17,647 of 1908.)

DRYING AND GRINDING—Apparatus for Drying and Grinding Materials. Gottlieb Suter, Basel, Switzerland, assignor to the Firm of Society of Chemical Industry in Basle, Basel, Switzerland. (U. S. No. 932,727, August 31, 1909.)

ELECTRIC FURNACE. Frederick M. Becket, Niagara Falls, N. Y., assignor to Electro Metallurgical Company, a Corporation of West Virginia. (U. S. No. 932,368, Aug. 24,, 1909.)

ELECTRIC FURNACE. John A. Hay, London, England, assignor to American Electric Furnace Company, New York, N. Y., a Corporation of New York. (U. S. No. 932,469, Aug. 31, 1909.)

ELECTRIC FURNACE. Gilbert C. Landis, York, Penn., assignor to American Phosphorus Company, Camden, N. J., a Corporation of New Jersey. (U. S. No. 932,296, Aug. 24, 1909.)

ELECTRIC FURNACE. William A. Smith, Niagara Falls, N. Y., assignor to International Acheson Graphite Company, Niagara Falls, N. Y. (U. S. No. 935,937, Oct. 5, 1909.)

ELECTRIC FURNACE TERMINAL. Eben C. Speiden, Niagara Falls, N. Y., assignor to International Acheson Graphite Company, Niagara Falls, N. Y., a Corporation of New Jersey. (U. S. No. 935,939, Oct. 5, 1909.)

ELECTRIC FURNACE. Frank J. Tone, Niagara Falls, N. Y. (U. S. No. 932,069, Aug. 24, 1909.)

ELECTRIC FURNACE. Jean B. Trillon, St. Jeoire, France, assignor to himself and La Société Electrochimique du Giffre, St. Jeoire, France. (U. S. No. 932,835, Aug. 31, 1909.)

ELECTRIC FURNACES—Improvements Relating to Electric Induction Furnaces. Gröndal Kjellin Co., Ltd., London, Eng. (Brit. No. 8194 of 1909.)

FURNACE for Smelting Ores. William Kemp, Tucson, Ariz., assignor, by direct and mesne assignments, to The Kemp Hydro-Carbon Furnace Company, a Corporation of New York. (U. S. No. 936,781, Oct. 12, 1909.)

FURNACES—Improvements in Furnaces. John J. Jones, New Castle, Penn. (Brit. No. 4070 of 1909.)

FURNACES—Improvements in or Relating to Furnaces for Volatile Metals. W. Hommel, London, and The Metals Extraction Corporation, Ltd., London, E. C. (Brit. No. 19,667 of 1908.)

FURNACE-PORT COOLING MEANS. Frank E. Parks, Pueblo, Colo. (U. S. No. 932,493, August 31, 1909.)

LADLE CONSTRUCTION. Richard H. Stevens, Munhall, Penn., assignor of one-half to Per Torsten Berg, Stockholm, Sweden. (U. S. No. 934,946, Sept. 21, 1909.)

MELTING APPARATUS. William M. Carr, New York, N. Y., and Charles H. Speer, Chester, Penn. (U. S. No. 936,759, Oct. 12, 1909.)

MELTING-FURNACE and Process of Using the Same. William M. Carr, New York, N. Y., and Charles H. Speer, Chester, Penn. (U. S. No. 936,758, Oct. 12, 1909.)

METALLURGICAL FURNACE. Robert Hübner, New York, N. Y. (U. S. No. 934,532, Sept. 21, 1909.)

OIL-BURNING FURNACE. Charles A. Hammel, Los Angeles, Cal. (U. S. No. 935,202, Sept. 28, 1909.)

REDUCTION FURNACE—Furnace for Reducing Ores. Gustaf Gröndal, Djursholm, Sweden, assignor to American Gröndal Kjellin Company, New York, N. Y., a Corporation. (U. S. No. 936,124, Oct. 5, 1909.)

REGENERATIVE FURNACE. Jacob B. McKennan, Pueblo, Colo. (U. S. No. 936,930, Oct. 12, 1909.)

REGENERATIVE FURNACE—Flue and Valve System for Regenerative Furnaces. Jacob B. McKennan, Pueblo, Colo. (U. S. No. 936,931, Oct. 12, 1909.)

SLAG GRANULATION—Improvements in or Connected with Granulators for Molten Slag or other Substances. William R. Warren, New York City. (Brit. No. 1236 of 1909.)

SLAG-HANDLING TABLE. David T. Croxton, Cleveland, Ohio. (U. S. No. 934,998, Sept. 28, 1909.)

SMELTING-FURNACE. Joseph P. Welch, Salt Lake City, Utah, assignor of one-half to Jay J. Snider, Salt Lake City, Utah. (U. S. No. 937,030, Oct. 12 1909.)

SMELTING-FURNACE. Christian Debus and Josef Debus, Höchst-on-the-Main, Germany. (U. S. No. 934,892, Sept. 21, 1909.)

SMELTING-FURNACE — Transforming Smelting-Furnace. Hugo Helberger, Munich, Germany. (U. S. No. 932,986, Aug. 31, 1909.)

STARTING AND CONVEYING DEVICE FOR FURNACES, Utley Wedge, Ardmore, Penn. (U. S. No. 927,389, July 6. 1909.)

Personal

Mining and metallurgical engineers are invited to keep THE ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

Charles E. Hart, of Joplin, Mo., is in Guatemala on mining business.

C. S. Herzig, of London, is on his way to Nevada. He will return to New York, and then will go to Central America.

E. G. Spilsbury, of New York, has gone to Nevada on professional business, which will probably occupy him for some time.

F. W. Denton and R. T. McKeever have been chosen vice-presidents of the Copper Range Consolidated Mining Company.

A. E. Drucker has just completed a visit to the Witwatersrand gold mines. He expects to be in New York in December.

Harold Boericke, of the firm of Stein & Boericke, of Primos, Penn., is looking after tungsten mining interests in Boulder county, Colorado.

Professor Reiji Kanda, professor of mining engineering in the Imperial University at Tokyo, Japan, has been visiting mines in the United States.

O. Potter has been appointed assistant superintendent of the Superior copper mine in the Lake district, which is controlled by the Calumet & Hecla.

W. H. Herdsman, of London, has been examining iron properties in Nova Scotia. After doing similar work in Newfoundland, he will return to England.

James Cronin, of Spokane, Wash., has returned south from the Babine range, in northern British Columbia, where he is prospecting a silver-lead property.

Anthony J. McMillan, general manager of Le Roi Mining Company, has returned to Rossland, B. C., from a business visit to New York and other eastern points.

Charles Camsell has returned to Ottawa, after completing his third season of geological survey fieldwork in the Similkameen district, in British Columbia.

H. A. Megraw has been appointed superintendent of the Hacienda Santa Elena at San Luis de la Paz, Guanajuato, Mexico, and has taken charge of the works.

R. H. Chapman, of Washington, D. C., in charge of a party making a topographical survey of Vancouver island, in British Coulmbia, has left Victoria for Ottawa.

Holland E. Benedict, assistant superintendent of the United States Smelting Company, at Bingham Junction, Utah, was married on Oct. 20, to Miss Amelia Ridgeway Gilbert of Boston.

Dr. A. R. Ledoux will shortly visit South Dakota to inspect the recent developments on the old property of the Harney Peak Tin Company, now owned by the Pahasa Mining Company.

Charles E. Hellier, president of the Big Sandy Coal Company, has been visiting Connellsville, Penn., for the purpose of making tests of coal from the Pike county field of Kentucky in the making of coke.

James Bartlett, inspector on the staff of the Provincial geologist of Ontario, is making an official investigation of the reported discoveries of gold near Night Hawk lake, in Whitney township, Northern Ontario.

Walter Harvey Weed and Frank H. Probert are examining the mines of the Proprietary Mines Company at Guanajuato, Mexico. When this work is completed Mr. Probert will visit Pachuca before returning to Los Angeles.

Dr. W. R. Crane, dean of the Mining Department of the Pennsylvania State College, has arranged to deliver a series of lectures before the local mining institutes in both the anthracite and bituminous regions of Pennsylvania.

Peter Eyerman, chief engineer of the Dubois Iron Works, Du Bois, Penn., has resigned that position and accepted an engagement with the Witkowitz Steel Works, the largest in Austria. That company is preparing to enlarge its works, and proposes to introduce some features of American practice.

Leslie Hill, of Nelson, engineer in charge of the Hastings (British Columbia) Exploration Syndicate, and the Head Syndicate, recently accompanied James Head, of London, chairman of both companies, on a visit of inspection of the gold mine of the former and the coal mines of the latter, in British Columbia and Alberta.

Obituary

E. G. Vogel died at Las Minas, Vera Cruz, Mexico, Oct. 9; aged 72 years. He had been a resident of Mexico for 45 years, most of that time engaged in mining. He was manager and part owner of Las Minas Mining Company for a number of years.

A. E. Humphreys died in Pittsburg, Penn., Oct. 19, aged 63 years. He was well known as a coal-mine manager in western Pennsylvania. He was born in Wilkes-Barre, Penn., and had his first experience in the anthracite country, going later to the bituminous fields. He lived at Irwin, Penn., for 25 years, holding the position of general superintendent of the Westmoreland Coal Company. He resigned to accept a position with the Ellsworth Coal Company, and later with the New River Coal Company of West Virginia, and at his death was president and chief owner of the Humphreys Colliery Company, of Philippi, W. Va. He leaves a widow and eight children.

Frank H. Sherman, for years the leader of organized labor in the coal-mining districts of Alberta and southeastern British Columbia, died at Fernie, Crow's Nest Pass, B. C., Oct. 11, aged 40 years. His untimely death occasioned general mourning throughout the somewhat extensive region in which he had for years been a prominent and striking figure. He was born in Gloucester, England, and brought up as a coal miner in Wales. In 1903 he went to Canada and settled in the Crow's Nest Pass country. When the United Mine Workers organized in the district, he was chosen district president and had held the office ever since. He was generally recognized as an able and adroit, but fair and honest leader.

Societies and Technical Schools

Kanawha Coal Operators' Association—At the annual meeting in Charleston, W. Va., Oct. 16, the following officers were chosen: President, William Seymour Edwards, Charleston, W. Va.; vice-president, William Mitchell, Plymouth, W. Va.; treasurer, E. O. Dana, Cincinnati, O.; secretary and commissioner, D. C. Kennedy, Charleston, W. Va.; executive board, John L. Dickinson, J W. Dawson, Quinn Morton, L. H. Lee, N. D. Monsarrat, J. W. Moore and F. H. Palmer

West Virginia Coal Mining Institute—The winter meeting will be held at Huntington, W Va., Dec. 7-9. The program inculdes two business sessions each day, on Dec. 7 and Dec. 9, at which the following papers will be read and discussed:

"What shall we do with the Oil and Gas Wells on our Coal Properties?" E. B. Moore, Fairmont, W. Va.

"The Underground Manager." Joseph Virgin, Plymouth, W. Va.

"Practical Fuel Values." W. P. Young, Myersdale, Penn.

"Outside Arrangements of a Modern Coal Mine." Warren R. Roberts, Chicago, Ill.

"Observations in European Coal Mines." Frank Haas, Fairmont, W. Va.,

"Some Conditions Affecting the Coal Mining Industry of West Virginia." E. W. Parker, Washington.

"The Relation of Foreign Labor to the Demand for Increased Coal Production." Neil Robinson, Charleston, W. Va.

"The Mine Department of West Virginia, its Relation to the Coal Producing Interests of the State in General." John Laing, Charleston, W. Va.

"Required, A New Pair of Glasses." Fred C. Keighley, Uniontown, Penn.

"Proper Material for Coke Oven Construction." T. I. Brett, Fairmont, W. Va.

Dec. 8 will be devoted to a visit to the mines of the U. S. Coal and Oil Company at Holden. The meeting will close with a dinner at Huntington.

Special Correspondence from Mining Centers

News of the Industry Reported by Special Representatives at Butte, Denver, Salt Lake City, Goldfield, Cobalt and Toronto

REVIEWS OF IMPORTANT EVENTS

San Francisco

Oct. 22—The largest hydraulic mine in California, and for that matter, in the United States, is the La Grange, near Weaverville, Trinity county, where the practice is of the best under the direct supervision of P. Bouery, a skilful mining engineer. The company has a large body of gravel and a fine water supply on which large sums have been spent. Now there is to be a rival to this mine at Scales, Sierra county, where the Neocene Placer Mining Company is about to begin operations with three giants, the new dam having been completed. This new concrete dam for débris, built under supervision of the California Débris Commission, is 200 ft. long, 45 ft. high, and 14 ft. thick at base, narrowing to four feet at the top. It is designed to restrain 400,000 cu.yd. of mining débris. The ground to be worked is that of the old Cleveland company which just got into operation when the anti-débris laws became effective. The superintendent of this new enterprise is K. D. McLean, of San Francisco, but the company is of Los Angeles origin. The dam has been built to comply strictly with the prevailing laws and no trouble is expected from those opposed to hydraulic mining although, no doubt, a close watch will be kept on operations by the Anti-Débris Association, which is opposed to hydraulic mining under any conditions. The company owns some 9000 lineal feet of the gravel channel. There is every chance to enlarge the capacity of the holding reservoir behind the dam when it becomes filled. Operations will commence on this property within a few weeks.

The Pittsburg mine, Nevada City, has now been fully reopened and the mill started on ore from the 700 and 900 levels. The electric equipment on the Pittsburg is one of the most complete in the mines on the coast.

The Inca Treasure Company has attached the mines on Dog Creek, near Delta, owned by the Delta Consolidated company to secure payment of several thousand dollars alleged to be due. A few weeks previous the Delta Consolidated Mining Company brought suit against the Inca Treasure company demanding a lot of money and stock. The affairs of both companies are intertwined and the courts are called upon to unravel the tangle.

Denver

Oct. 22—In the Cripple Creek district, in view of the advance of the Roosevelt deep drainage tunnel, now within measurable distance of completion, additional interest is lent to the oft-recurring strikes of high-grade ore in the deep levels, say, 1000 ft. and more below the surface, and sinking is greatly on the increase in consequence. Bull hill is especially active. The leaser on the Burns claim of the Acacia company is said to be shipping $30 ore, as is also the South Burns Leasing Company; and the Silver Tip mine, adjoining the Pharmacist, is also shipping and installing additional machinery. The lessees on the Bison, of the Free Coinage company, are also reported to be shipping 2-oz. gold ore. Three lode claims on Beacon hill, adjoining the El Paso company's mine, have been taken under bond and lease by Eastern people, and will be extensively worked under the management of Gen. Sherman M. Bell. These mines, the property of the Republic Gold Mining Company, are among the first to be drained by the Roosevelt drainage tunnel. The Sam Macdonald lease and the Jesse Waters lease on the Jennie Sample, on Raven hill, are producing steadily. The Empire State workings of the Isabella company, on Bull hill, have been leased for two years to T. B. Burbridge. A Denver syndicate, represented by Allen Burris, president of the El Paso company, is rapidly acquiring the shares of that company, and has just paid $45,000 on account for 72,500 shares. The September production of the Vindicator mine will approximate a bullion value of $45,000. This mine has made a remarkable record inasmuch as it has been producing steadily for 16 years with a record of a gross product of gold ore to the value of $8,200,000 up to Jan. 1, 1908, and a total, including that to be paid Oct. 25, of $2,047,500 in dividends. It has upward of 29 miles of underground workings, and not the least important fact is that some of the best ore discoveries and production have been made at the 1200, 1300 and 1400 levels.

Prof. R. D. George, the director of the Colorado Geological Survey, has issued his first report on the tungsten area of Boulder county; reports will also be issued on the Montezuma mining district, and on the Hahns Peak region.

Butte

Oct. 23—The plan of the American Metal Company to erect a mill at Butte for treating the zinc ores of the Butte & Superior company has aroused much interest. The Metal company will advance to the Butte & Superior company $250,000, of which $150,000 will be used in the erection of the zinc mill, and the remainder used for surface improvements and development at the Black Rock mine. Besides the zinc deposits in the Butte & Superior porperty, the Elm Orlu mine of W. A. Clark has a large body of the same ore, and Butte Coalition's Alice mine and the LaFrance company's Lexington mine and the Butte Copper and Zinc Company's Emma mine all have large deposits of zinc. In the Emma mine a report, made several years ago, shows that between the 400- and 800-ft. levels there is an orebody of from 125 to 130 ft. wide which assays from 17 to 32 per cent. zinc. The shaft of the Black Rock mine is now down 1600 ft. A 50-ft. sump will be sunk and then a station will be cut at the 1600-ft. level. The Butte-Milwaukee Copper Company, the property of which adjoins that of the Butte & Superior, will soon resume operations.

The Butte & Balakalava Copper Company will soon begin making shipments to the Washoe smeltery, Anaconda, at the rate of 50 and 100 tons daily. The new ore bins of the property have been completed. Work is being done on the shaft, which, when completed, will make the entire length three compartments. A new steel gallows frame 98 ft. high has been ordered. The property has been well developed within three years, and now has 11 levels from which ore is being produced. The water from the mine is brought to the 1200-ft. level and from there flows into the workings of adjoining Amalgamated properties, and is pumped by the latter company under an agreement.

Salt Lake City

Oct. 22—The control of the Ajax mine has passed into the hands of Col. C. E. Loose and associates which may mean another consolidation in the Tintic district. Colonel Loose also owns a control of the Golden Chain, and a large interest in the Pedro and Cleveland, properties adjoining the Ajax, and it is supposed that the mines will be consolidated into one company and that they will be worked through the Ajax workings which have reached a depth of 1200 ft. While the Ajax is considered a "worked out" mine, its deep workings and valuable equipment may be used to an excellent advantage to develop the virgin country in the adjoining properties.

The Superior Fuel and Briquet Company has taken over the Gomer Thomas coal mine near Coalville and has installed machinery that will manufacture briquets at a rate of 160 tons a day. Exhaustive

tests have proven the coal of this mine exceedingly well suited for briquet manufacture. A native asphalt has been found which makes an excellent binder.

The Boston Consolidated output during September was over 2,000,000 lb. of copper, a material increase over the August output of 1,666,301 lb. The report given to the American Institute of Mining Engineers during the visit to the camp showed that during September 7178 dry tons of sulphide ore were mined at a cost of $1.68 per ton and the caving system in the porphyry deposits brought down 71,880 tons at a cost of 66.7c. per ton. The mill treated 72,000 tons of ore during the month producing 1,569,000 lb. of copper, an average recovery of 21.8 lb. to the ton. The management states that the cost of production is at present below 10c. per pound.

Mineral, Virginia

Oct. 24—Near Mineral, Louisa county, Va., the pyrite mines of the Armenius Chemical Company and the Sulphur Mining and Railroad Company are running with full crews of about 300 men each.

The Armenius has now reached a depth of 1060 ft. but the orebody which was 60 ft. wide on the 960-ft. level has not as yet been cut on the lowest level. Ore is being extracted from the 200, 860 and 960 levels and about 400 tons sent to the mill per 24 hours. A new shaft, 6x14 ft. in the clear, is being sunk to the north of the present shaft; it is situated about 50 ft. from the orebody in the footwall and from it drifts and crosscuts will be run in order to rob the ore which has been left in the stopes.

At the Sulphur Mining and Railway Company's mine work is being pressed on the new vertical three-compartment shaft which will replace the three inclined ones now used and the necessary underground development to enable the orebody to be worked from the new shaft. Sinking has now reached a depth of 250 ft. To meet the contingencies of the large tonnages a new mill with a capacity of 30 tons per hour will be erected to replace the present one which was designed for 20 tons per hour. It is expected that the new mill will be in operation by the middle of next year. At the present time the output of the mine, as a consequence of the large amount of dead work being carried on, is below normal.

The Boyd-Smith mine is still closed down pending an accounting between United States Fidelity and Trust Company and Capt. Boyd Smith. This property is situated between the Armenius and the Sulphur companies' mines. It has been idle for about a year. It is reported that the Hemmer heirs intend to shortly open the Julia mine which is situated about a mile southwest of Mineral.

About six miles northeast of Mineral, Captain Smith has a crew of four men developing the old Allie Cooper lead-silver mine which was opened before the Civil war. Over in Spottsylvania county John M. Holladay, and James B. Elam and Thomas Jeffress, of Richmond, has a small crew at work developing what is claimed to be a large pyrite orebody.

Cobalt

Oct. 24—Much uneasiness was caused by the slump in La Rose and Nipissing stocks, which was much more pronounced in the former. There does not seem to be any good excuse, although it is reported that the Guggenheims are responsible, and that they hammered the stock in an effort to buy in at a lower figure. The probable fact is, however, that it is due to manipulation by some inside New York interests. The La Rose stock has always been very carefully nursed, and this is the first time it has been affected since the consolidation.

The first mine to benefit by the electric power which is being brought into camp is the Colonial, when a few days ago the mill was started. The transmission line is now being extended to the King Edward, where everything has been in readiness for some time. This power, however, is being furnished by a small temporary generator, and the main plant will not be completed for some time yet. This is one of the most important events in the history of the camp, and when all the mines are in a position to benefit by the air and electricity, a great impetus will be given to operations, and mining costs will be materially lessened. At the present time the cost of power on the average is about $175 per horsepower a year, but a great many of the mines run well above this figure. The new power will be sold for $50. Good progress is being made with the work on the Cobalt Hydraulic Company's plant, and about nine miles of the 20-in. mains and five of the 12-in. have been connected up. This company expects to have the air ready for delivery in December. The work on the plant of the Mines Power, Ltd., is also progressing rapidly, and there are about one thousand men at work. The big 5000-cu.ft. compressors are to be shipped from England within the next two weeks.

The cyanide plant in operation at the O'Brien mine has now been running over two weeks, and the results so far have exceeded the expectations of the management. It was found that the cyanide consumption amounted to about 46c. per ton, which is much less than was estimated, and the tailing assays only run about 40c. to the ton. It is understood that the management will cut out straight concentration and will cyanide direct. This process is practically new to the camp, and is only being used in one other mine. It is doubtful, however, considering the very complex nature of the Cobalt ores, if direct cyaniding can be successfully applied, but the probability is that before long many of the concentrators will be equipped with plants for cyaniding the slimes. This process is being used at the Buffalo with marked success.

It has been announced that the Union Pacific Mining Company, operating on Peterson Lake, has secured control of the Michigan property, which adjoins the Farah and Silver Leaf. The price was $240,000, $140,000 of this to be paid at once, and the remainder within five years. This property is very well located, but up to date very little work has been done. One shaft has been sunk to a depth of 120 ft., and from this a few drifts were run. A Montreal company, called the Cobalt Twins, has purchased a 20-acre claim near the Century mine, and several other claims in the neighborhood will be secured by the same company.

Toronto

Oct. 24—The Ontario government has imposed a new condition in connection with the sale of mining lands on the Gillies Limit. A stipulation is introduced that the purchaser must not sell or dispose of the land to any corporation other than one incorporated under the laws of Ontario, otherwise the patent will be void. The reason assigned is that purchasers at former sales have, in at least one instance, obtained a Dominion charter, giving much wider powers than are conferred by the province.

Prospectors in large numbers continue leaving the Cobalt district and other places in northern Ontario for the new gold field in Whitney township. Twenty canoe parties left Haileybury, Oct. 20.

An official of the Canadian Geological Survey has discovered a valuable specimen of fluorspar in Madoc township, Hastings county, Ont. Samples of celestite have also been found in Lansdowne township, Leeds county, Ontario.

Reports of the new goldfields in the Porcupine country continue to come in, and there is no indication as yet that the rush into this section is abating. Mosco Vici, who is associated with Dr. Milton Hersey, of Montreal, in some of his interests in this camp, is now on his way to inspect some of the recent discoveries. The department of mines has also sent in an engineer to examine this district, and make a report on those townships where the discoveries are reported, namely, Munro, Tisdale and Whitney. It is reported that one claim has changed hands for $10,000. The Painkiller Lake district is showing up well under development.

Most of the prospectors are now beginning to leave the Gowganda district, and it is expected that very little will be done before the winter roads are in shape. When that time comes two or

three of the properties will be in a position to ship ore, as the Reeves-Dobie and the Blackburn have on hand enough to make a shipment. Up to date the Bartlett, of which so much was heard last winter, has found little of note. The shaft on the main vein was sunk a distance of 100 ft. and a crosscut driven to catch the vein on the dip, but it has not been found, and it is believed that the veins pinched out before that depth. The No. 2. shaft, however, sunk on a smaller vein, has opened up some good ore at the 75-ft. level. Transportation conditions will be much better this winter and consequently supplies will be much cheaper. The Reeves-Dobie has made a contract to take their ore out over the Bisco road from the mine for $15 per ton.

Mexico

Oct. 23—A correspondent from Monterey writes as follows concerning the zinc situation: "The general conditions of the zinc-mining industry in northern Mexico have lately suffered to a certain extent by reason of the new American tariff. Since the date of the said tariff becoming effective, shipments to the United States have ceased, or have been limited to the ores that were in transit from the mines to the railroad shipping stations, or under contract with the purchasers. But this has only been a temporary setback of short duration and of unimportant ill consequences as compared with the improvements that we expect from our actual awakening to the adaptation of future commercial conveniences. It is unquestionable that the United States tariff, or its effects on our zinc ores, will stimulate improvements in the methods of their disposal, which I do not hesitate in believing will be, in the end, the smelting of these ores at home, followed by the development of industries in the various applications of the zinc products. For the present, however, our immediate relief comes from shipments being diverted to Europe. Arrangements have been made to handle the ore economically and in bulk at Tampico, and shipments have already started on that route, by way of San Luis Potosi, to be followed by others from Monterey and tributary points, directly to Tampico, just as soon as the flood damages to the railroad have been repaired. Arrangements have also been made and concluded for shipments by way of Galveston, Tex., the ore in this case, of course, going in bond. These shipments will commence just as soon as the International & Great Northern railroad can legally make effective the freight rate that it has named for transportation between Laredo, Tex., and Galveston. The cost of freight and shipment, as above, compares about equally with the charges for transportation that were previously paid to the United States markets, but we are expecting a reduction of about $2 per ton in favor of European shipments. There is great demand of zinc ore for Europe at present, and this accounts for the price of spelter gradually rising. This, with the added possibility of lower freight rates by the Mexican roads, and the further expectation of competition between the ports of Tampico and Galveston indicates some improvement over the present anomalous conditions into which the American shut-off has thrown us."

The Mexican zinc miners are interested in the prospects of some arrangements by which the foreign ores can be treated in the United States and a drawback allowed for the export of the equivalent of the metal product. The matter is before the United States Treasury Department, and some arrangements are confidently expected soon.

Owing to the unseasonable frosts in Mexico, extensive areas are likely to suffer on account of the failure of the corn crop. In order to obviate this, the government has removed the import duties on corn as it did in the case of wheat last summer. The agricultural conditions of the countries tributary to the mining section is a vital matter to the mining industry, as it affects the price of labor, and in years when the agricultural interests are exceedingly active, labor is scarce. When the products are high, it is necessary for the mines to pay more in wages, as the average wage in Mexico is based on a very close margin over the actual living scale.

The exports for Mexico for July, 1909, as reported at the customs' offices, amounted to 12,273,843 pesos, an increase over the corresponding month of last year of 728,966 pesos. The imports for the month amounted to 22,143,792 pesos, an increase of 5,692,839 pesos. The mineral products exports amounted to 3,364,777 pesos, a decrease of 178,186 pesos. The increase in imports is accounted for largely by gold and silver imported. The gold import was 4,476,745 pesos, an increase of 2,794,635 pesos, and the silver 7,008,942 pesos, an increase of 2,794,635 pesos over the corresponding month of 1908.

London

Oct. 23—There has been issued the prospectus of a new mining company to acquire a group of mining leases situated at Silverton, Slocan lake, British Columbia. These leases have been acquired and reported on by M. S. Davys. The principal lease to be acquired is that of the Hewitt mine, which has so far produced 15,000 tons of ore, of which about one-third has been sorted out and sold to smelters for a net return of $42.37 per ton. The remaining two-thirds of the tonnage produced lies on the dumps and in stopes, being reserved for milling. The working capital now being offered for subscription is £10,000, which is to be devoted to driving tunnels on the Hewitt group and for opening the mine for a daily output of 100 tons, for the purchase of a small compressor and for certain development work on the Tiger group. The ores to be worked are silver-lead and zinc. The working capital provided seems very small and attention is directed to some observations made below.

The Akrokerri (Ashanti, Africa) Mines, Ltd., a company which has been in existence about nine years, is to be wound up on account of failure to make profits. During 1907 the mine produced 14,341 fine oz. of gold and during 1908, 14,504 oz. Since crushing started in 1905 the gold production has totalled about £307,000. It is a pity to see a mine like this, which has given proof of the presence of mineral wealth, go under. The failure to make both ends meet in spite of a considerable output, calls attention to the disadvantages that West African mining labors under. The grade of the ore has been such as would give handsome profits to a mine working in South Africa or the United States. Whether the ore is really all exhausted or whether development has been neglected, are questions which without an intimate knowledge of the history of the company, cannot be answered. But it seems not unlikely that the failure is due to the neglect of development.

Several of the West Africa mining companies from which great results were expected last year have been reconstructed, owing to neglect of development on a sufficient scale. Mines without reserves soon get into financial difficulties, leading to instructions being sent to the manager to raise the grade in order to keep the company alive. There is always the chance that by some piece of luck a fresh orebody may be met with which will enable the normal position to be eventually recovered. But, as a rule, a heroic measure such as this leads only to an exhaustion of the reserves and a collapse of the company.

Insufficient development is one of the principal reasons for the failure of mines to pay dividends. It leads to overcapitalization, for mines in difficulties can only raise fresh funds on disadvantageous terms. If engineers would insist on the provision of adequate capital for development when recommending mines for flotation, the number of mines that pay no dividends would be far smaller. But in many cases under pressure from the financier the engineers allow themselves to take a too optimistic view of the money that will be required to put the property in a sound remunerative position with the result that the mine does not have a fair chance and ends in bankruptcy. Akrokerri may or may not have been mismanaged, but it provides a text for calling attention to the reasons why so many mines come to grief, which if the lessons taught by experience had been paid attention to, might have succeeded.

Mining News from All Parts of the World

New Enterprises, Installations of New Machinery, Development of Mines and Transfers of Property Reported by Special Correspondents

THE CURRENT HISTORY OF MINING

Alaska

Juneau—The Alaska Gold Quartz Company in the Willow creek region recently lost its entire cleanup through the explosion of the retort.

Cordova—Railroad traffic on the Copper River & Northwestern has been interrupted by a coal famine. In resolutions adopted by the chamber of commerce of Cordova, Congress is urged to pass laws which will allow Alaska to mine its vast coal deposits.

Fairbanks—The unexpected freeze on the Tanana river caught a number of steamers. Two loaded with stampeders for the new Iditarod diggings were frozen fast. Over 1000 tons of machinery within a short distance of Fairbanks will not be available until May.

Arizona

COCHISE COUNTY

Arizona Metals Company—A company with Charles F. Dick, of Washington, D. C., at the head, has purchased 540 acres of mineral land at Teviston, formerly Bowie.

GILA COUNTY

Boston-Miami Development Company—This company has contracts for 42 claims in the Miami district adjoining the Live Oak and New Keystone. Exploration by churn drills will be undertaken. F. W. Hoar is superintendent.

Ray Consolidated—The company has spent $125,000 for lands and right of way at Winkleman for a smeltery. Work on the foundation for the plant has been commenced. Twelve drills are being used and the prospect bores are down to 900 ft. in some cases. The shaft is now at 300 ft., and four levels will be run. Steel for the 5000-ton concentrator is being received and work on site is progressing. About 80 per cent. of the railroad grade from Kelvin to Ray is completed. The orebody, as disclosed by the drills, is thicker toward the upper end.

SANTA CRUZ COUNTY

Pulaski—Martin Michelski has given a bond on the group, in the Josephine cañon of Santa Rita range, for $25,000 to E. E. Bethel, who will begin work.

Mowry—The mine has hopes of starting up again after a closure of two years.

YAVAPAI COUNTY

Pacific Copper Company—Extensive development is under way on the property in the Silver mountain district. The shaft is down 310 ft. and in all about 1000 ft. of work has been done. The ore developed carries gold and copper. C. W. Mitchell, who is also interested in the Arizona-Empire, is consulting engineer.

Gold Road—The new mill is now in operation treating ore from the 1000-ft. oreshoot on the 700-ft. level of the Billy Bryan and Gold Line claims.

YUMA COUNTY

Southwestern Mining and Milling Company—The company has been organized at Phœnix with J. D. Mitchell, manager, to operate properties northeast of Vicksburg. A 20-stamp customs mill will be erected.

Arizona-Empire—The company is developing a property near Parker and is planning to erect a smeltery. About 6000 ft. of development work has been done.

California

MARIPOSA COUNTY

Number Five—E. S. O'Brien, of Merced, manager, has bought machinery to sink 300 ft. for the mine near Hornitos, and a mill will be installed.

Crown Lead—The property at Nameless dam has been purchased by E. S. Lewis, who has bought a 20-stamp mill. An aërial tramway is to be built from the mine to mill, and the mill increased to 40 stamps.

MONO COUNTY

Masonic Mountain—The property of this company is now under option to the Pittsburg-Liberty Mining Company. A tunnel is being run on the True Friend claim.

NEVADA COUNTY

Shebley—George Shebley has bonded his claim in Chicago Park district and it will now be steadily worked.

Delhi—Fire has destroyed the compressors and buildings at North Columbia owned by the St. Gothard company; loss $20,000.

Grass Valley-Dana—All the machinery at this mine, Grass Valley, has been started up with the new electric-power plant. The shaft will be sunk 500 ft. before doing other work; Frederick Godfrey, superintendent.

Erie—The work of reopening this mine at Granitveille has begun under R. G. Eckis, and the 30-stamp mill started.

Yuba Consolidated—The company has been reorganized with John M. Chase as president. The new company will put in a tramway, another air compressor, and a larger electric plant. It owns the Yuba and Gray Eagle mines at Washington. A new hoist will be built for the Yuba, a concentrating plant will be installed, and the mill enlarged. The Gray Eagle has a 10-stamp mill.

Erie—At the mine, Graniteville, R. G. Eckis, manager, the 30-stamp mill will soon be running.

Red Cross—The company at Omega has ordered a Huntington mill and operations are to be resumed at the mine on a larger scale.

PLACER COUNTY

Adventure—This quartz mine at Sucker Flat, has been sold at administrator's sale to R. L. Turner of Colfax.

PLUMAS COUNTY

Gassner—San Francisco men are reported to have bought this mine, on the north fork of Feather river. A steam shovel will be used to mine the gravel.

SHASTA COUNTY

Mammoth—The company will probably build a bag house to relieve the smoke-damage situation. The other smelters in the Shasta district are considering similar action.

SIERRA COUNTY

Bunker Hill and Gibraltar—The shaft of the Gibraltar mine, near Downieville, is down 300 ft., and the gravel has been cut. Gravel has also been struck in the Bunker Hill, near the same place.

Kate Hardy—Good ore has been found in this mine at Forest and a mill will be erected.

Sailor Ravine—At this mine, worked by Frye & Winrod, the arsenical sulphurets being taken out are improving. The richest are being treated at the mine in a small furnace.

SISKIYOU COUNTY

Yellow Butte—This company has been reorganized and the development of the copper mines at Weed will now commence.

Mt. Vernon—This mine, near Yreka, is again being opened up after being closed a few years.

Colorado

BOULDER COUNTY

Dom Pedro—An air compressor will be installed for driving the tunnel at Jamestown.

Victoria—This property at Summerville is being unwatered.

Gold Farm—This mine at Magnolia has

been sold to H. Wilkins, of Columbus, Neb., for $20,000, and a 50-ton cyanide plant to handle the low-grade ores will be built.

Lincoln—A 50-ton cyanide mill will be built at Sugar Loaf. N. M. Nelson, manager.

Alton—A 50-ton cyanide mill will be built at this property near Cardinal.

CLEAR CREEK AND GILPIN COUNTIES

Elephantine—This group has been purchased by Lendecke & Shields, of Georgetown, who will operate.

Gregory-Bobtail—A strike in the Gregory, of the Fifty Gold Mines Company, at Central City, of 4½ ft. of ore, 12 in. of which is said to carry 12 oz. of gold per ton, with silver and copper, making a total value of $300 per ton. The balance is good milling ore. The ore is delivered to the mill at Black Hawk through the old Bobtail tunnel.

Egyptian—The lessees of this mine on Quartz hill, have installed a new 60-h.p. boiler, and are shipping smelting ore of good grade.

Griffith—The company will work its mine through the Doric tunnel, by arrangement with the Doric Trust, Ltd., of London. The ores are lead and zinc, and will be treated in the "electrochemical" plant now being built near the entrance to the tunnel, and which it is expected will "extract the metals in bullion form."

Stanley—This mine at Idaho Springs, which has been practically worked out above water level, and the lower levels of which have been under water for many years, is to be pumped out and work resumed under the management of James Bowden.

FREMONT COUNTY

Copperfield Consolidated—The company has been formed to acquire the Red Gulch, Fremont, Queen-Princess and other properties near Cotipaxi. The new company will install an adequate plant and inaugurate extensive work. J. B. Conger is in charge.

GUNNISON COUNTY

Victor—A Boston company, Emil Peterson, manager, has a contract on the property in the White Pine silver-lead district and is shipping.

LAKE COUNTY—LEADVILLE

A large tonnage of iron ore is being shipped to the Arkansas Valley smeltery from the different shafts of the Penn mine, on Breece hill. Work has been started on the Curran and Grand Prize claims on Breece hill by the lessee, John Cortillini. The Highland Mary on Breece hill is sinking in ore, and the winze in the St Louis tunnel, present depth 150 ft., is going down on 3½ ft. of smelting ore.

Yak Tunnel—The bore has now reached the Resurrection No. 2 shaft, and drill holes are being advanced to drain the property.

Water Lily—The property on Cabinet hill is shipping argentiferous iron ore to the local smeltery and manganese ore to Pueblo.

Forest City—Work has been resumed in Big Evans gulch with the view of prospecting for the Valley oreshoot.

New Monarch—The company will install heavier machinery and sink the Cleveland shaft, South Evans gulch, to 1000 ft. The monthly output is 1500 tons.

PARK COUNTY

London—This mine at Alma has 16 four- and six-horse teams hauling ore daily from the mine to the railroad, and this will be kept up through the winter.

PITKIN COUNTY

Lead King—Work is started on this property near Crystal, by T. B. Crawford of Denver. The ore is complex.

Smuggler—A new orebody has been found in this mine and about 500 tons a day is being won from it. The find has stimulated other activity in the camp.

SAN JUAN DISTRICT

Silverton Camp—The Iowa-Tiger Leasing Company is still paying 20 per cent. per month dividends, and is said to have ore enough in sight to continue this for six months. The ore is silver-lead and is being concentrated at the mill in Arastra gulch. The lessees on the Silver Lake, on the same vein, are also doing well, and the lessees on the Zanoni lode recently shipped a small lot of 100 pounds of ore, on which the net smeltery return was $2100. The Gold Prince mine is sending 120 tons per diem to be concentrated at the Animas Forks mill. Reserves of ore are being rapidly blocked out under J. O. Campbell, manager.

Frank Hough—This mine, on Engineer mountain, has opened a vein of the high-grade copper ore which for some years has made this mine famous. The ore is going via Animas Forks to the Durango smeltery.

Treasury Tunnel—The bore at Red mountain has already penetrated one mile, and the company is preparing for all-winter work. A rise is being driven on one of the veins of ore intersected.

New Gold King—The mill is in commission with 80 stamps treating 200 tons daily. A saving of 90 per cent. is expected.

SUMMIT COUNTY

Wellington—A strike of galena ore is reported. The ores are delivered into the mill by electric haulage, a 60-ton electric locomotive having just been purchased. The production is about 300 tons per month at present.

Kimberly - Wilfley—The Marquette, Mich., company controlling this property at Kokomo, is planning to resume.

TELLER COUNTY—CRIPPLE CREEK

Dexter—An important strike has been made on Bull hill at 830 ft. by leasers.

Indiana

VERMILION COUNTY

Crown Hill No. 1—This mine, owned and operated by the Clinton Coal Company, has resumed work. The mine employs 300 men and has been closed for about 20 days during the past year. A cage became fast while coal was being hoisted and the large pulley wheels and timbers supporting them, at the top of the tipple, were pulled into the mine, making a shutdown necessary.

The United States Steel Corporation during the middle week of October paid to the land owners of Clinton Township more than $100,000 for coal lands and there are several hundred acres yet held under option that are to be likewise taken over soon.

Because eight machine men and as many helpers in the Leyford mine have been required to work at night they went on a strike and closed the mine for two days. The work was resumed after the company procured a new force of machine runners. The employees insist that the company enlarge its boiler capacity so that all men can be taken care of in day work. The officers of the company say that a new boiler will be ordered in a short time, with other improvements.

VIGO COUNTY

It is reported that a large tract of coal land in this county will soon be taken over by the United States Steel Corporation. This land adjoins that bought in Clinton Township, Vermilion county.

Idaho

BONNER COUNTY

Swastika—The company is doing development work at Lakeview. The plants for the smelter will not be developed until next spring. The manager is J. S. Ferguson, Sandpoint.

IDAHO COUNTY

Eagle—Two Tremain steam stamps and a cyanide plant have been purchased for this mine near Edwardsburg, W. A. Edwards, manager.

Oliva—A 15-ton Huntington mill is being installed and operation will be resumed.

Red Cross—The company will install a 250-ton mill.

Majestic—A 600-ft. tunnel is being driven and the working force increased.

Iowa

Shady Creek Coal Company—This company has been organized and has purchased three small mines near Oskaloosa. The intention is to consolidate and enlarge the mines, working them through a single slope, and largely increasing the output.

Dubuque & Superior—The zinc mine west of Dubuque will resume after two years' suspension. H. J. Connor, of Superior, Wis., is in charge.

Michigan

COPPER

Hancock—No. 2 shaft is 2000 ft. deep and a change has been noted in the formation. This has been unlooked for before 2200 ft. The winze from the 13th level of No. 1 shaft sinking on this lode has reached the 18th level, where it will be intercepted by the large working crosscut from No. 2 shaft, through which the rock coming from the 13th level down will be hauled and hoisted through No. 2 shaft to surface. The rise on this same lode from the 13th level has reached the 10th level with the same good results in a copper way. The drifts from the various levels are all in good ground and it is estimated that over 40,000 tons of stamp rock has been blocked out.

Gratiot—Work has started on the railroad spur to this property and rock shipment will be started.

Superior—No. 1 shaft is sinking below the 12th level and the drifts from the various levels are being extended with good results. Rock shipments continue to the Atlantic mill.

Isle Royale—The shaft on the Baltic lode is below the 600-ft. level. A change has been noted in the formation but without copper contents. The past month was the smallest from a tonnage point of view that this company has had in a long time, but it has been a better mineral yield.

IRON

Verona—Operations will be resumed on the Verona at Quinnesec and the Calumet at Metropolitan in charge of Charles E. Lawrence.

Channing—A branch of the railroad is being built to this new mine in the Amasa district, which was explored this summer successfully.

Conrad—This property at Clarksburg is being drilled by the Maas interests. It is two miles from the American.

North Armenia—A permanent equipment will be installed on this mine, known also as the MacDonald, at Crystal Falls, G. W. Young, Iron River, is in charge.

Walpole—High-grade iron ore has been found in this property at Iron River and drilling is under way to prove the extent of the find.

Minnesota

IRON

Corrigan-McKinney—The company will resume operations on the St. James at Aurora and the St. Paul at Hibbing after Jan. 1.

Vermilion Iron Development Company—The company is exploring on Pine and Murray islands, near Tower. A shaft will be sunk to 500 ft. W. P. McMillan is engineer.

Missouri

JOPLIN ZINC-LEAD DISTRICT

Little Pearl—This company mining on the land of the Continental company west of Joplin, has reported another rich drill strike of lead ore at 98 feet.

Carl Junction—Lead ore has been struck on the Bristow land north of Carl Junction at a depth of only 3 ft.

Cambria—Bendalari & Cook have installed a belt conveyer to handle the boulders from the platform to the dump, the first use of such device in this district.

Symmes—The company west of Joplin has begun operations after a long shutdown. A tramway 1700 ft. long has been built to a shaft southwest of the mill sunk in soft ground.. The mill formerly operated on sheet ground.

Overland—The mine at Duenweg in the sheet-ground district has resumed operations after two years. L. J. Stevison, Webb City, is one of the owners.

RANDOLPH COUNTY

Higbee Block Coal Company—A new 1000-ton plant is being put in at the mine near Higbee. The office of the company is in Kansas City. C. E. Larson, treasurer.

Montana

BUTTE DISTRICT

Coalition—The Tramway shaft is now down 105 ft. below the 1700-ft. level. The shaft at the Rarus is down 190 ft. below the 2000-ft. level, and a station will be cut when the 2200-ft. mark has been reached. The Rarus air-shaft is being enlarged to four compartments its entire length. It will take several months before this work is completed. The daily output of the Coalition properties now averages 1700 tons.

Davis-Daly—The Colorado shaft is down 1750 ft., and is being sunk 5 ft. per day. The company is shipping about 175 tons daily to the Washoe smeltery from the 1400-ft. level.

BROADWATER COUNTY

Ohio-Keating—Sinking is in progress, and the first car of ore has been shipped. On the 120-ft. level the drift north is advancing at the rate of 6 ft. a day.

Keating—On the 500-ft. level a new orebody 8 ft. wide has been struck. Seventy men are now employed and 100 tons of ore are hoisted daily.

DEER LODGE COUNTY

Cable Lease—H. Tonkin has recently been appointed superintendent for the company. It is the intention to begin extensive development work at once.

Bielenberg & Higgins Coal Mines—R. L. Stewart has been constructing an experimental plant at the mine for the manufacture of coal briquets. The property is three miles from Drummond.

Modoc Mining Company—The company has been formed to operate the Showers property on Cable mountain, under lease and bond.

FERGUS COUNTY

Kendall—A body of high-grade cyaniding ore has been struck on the 500-ft. level. Neither the foot nor hanging wall has yet been reached.

GRANITE COUNTY

Alps Group—Paul Neal and J. C. English, of Anaconda have obtained a lease and bond on the property for $60,000. The mines are in the Harvey Creek district and carry gold and silver.

JEFFERSON COUNTY

Boston & Corbin—The last of the new electric surface equipment is being installed and will probably be in operation by Nov. 1, at which time sinking to the 1000-ft. level will be resumed.

Montana-Corbin—W. D. Gibson, superintendent, has returned from the East and is in charge. The shaft will be unwatered, and then sinking continued to 500 feet. A 5-drill compressor is being installed, completing the surface plant.

LINCOLN COUNTY

Victor-Empire—A power plant is being constructed and a flume to bring water from Granite creek to the plant.

Kearney Group—John Lacharity, W. S. Megquier and M. S. Fullmore are working claims on Rainy creek, seven miles west of Libby. The tunnel on the North Star is in 190 ft. and the lode cut.

MADISON COUNTY

Tri-State—A new perpendicular shaft will be sunk 500 ft. on the Broadway in the Silver Star district.

SANDERS COUNTY

French Bar—The new two-compartment shaft is now in ore and will be continued to 125 ft. below the 150-ft. level. An electric hoist has been installed. Robert Roskelley is in charge.

Nevada

ESMERALDA COUNTY—RAWHIDE

Mint—The lease made a rich strike on the 440-ft. level, and the Coalition Mining Company is also working a part of the ground through the shaft owned by the Mint.

Pedro—The group of claims was recently bonded to E. C. Klinker, of Los Angeles, for $22,000. This is an old mine, and has a 100-ft. shaft and several tunnels. Machine drills have been purchased, and control of the Knight-Colon mill has been secured. The Pedro group is eight miles northeast of Rawhide.

Bovard Consolidated—The company at Bovard has a 25-h.p. engine in commission, and has the shaft down to 130 feet.

LYON COUNTY

Yerrington District—The mines are soon to be reached by a railroad from the

Southern Pacific north of Wabuska over to the Mason Valley company and around to the Nevada-Douglas company. The latter is across the range from the Blue Stone mine.

LINCOLN COUNTY

Pioche Camp—The properties shipping to the Tintic smeltery have been unable to get satisfactory arrangements with other plants to handle the ore. An investigation of the practicability of a smeltery at Pioche or Caliente is being made and the treatment of the zinkiferous ores of the camp is also being studied.

STOREY COUNTY

Comstock-Phoenix Company—On the Baker claim on the Brunswick lode in Six Mile cañon, this company is cutting a station on the main tunnel level to install an electric hoist preparatory to resuming sinking the winze now 60 ft. in ore.

Comstock-Mohawk—This company developing west of the Comstock-Phoenix has cut a lode supposed to be the Baker lode.

Lady Bryan—The company is crushing ore at the mill in Six Mile cañon. Pfeiffer Brothers, owners.

Mexican—The strike on the 2300-level continues to show good ore.

Ophir—The mine is shipping regularly with increased tonnage and improved grade. The Kinkead mill is running full time on Ophir ore.

Consolidated Virginia—This mine is again on the producing list from the 1850 level.

Savage—The upraise of this mine from the Sutro tunnel continues in low-grade ore.

Butters Mill—The plant in Six Mile cañon is working full capacity on tailings and ore from the Chollar mine.

Sutro Tunnel—The installation of 15,200 ft. of wood-stave pipe for carrying the hot water from the Ward and C. & C. shafts has been completed.

WHITE PINE COUNTY—ELY

Nevada Consolidated—The first dividend of this company amounting to 37½c. per share per quarter, or at the rate of $1.50 per year, has been declared for stockholders of record on Dec. 1, this date being set to permit bondholders of the company and shareholders of the Cumberland-Ely to take advantage of the conversion privilege. At the property the steam-shovel pits are being put in shape for winter operations.

Cumberland-Ely—It is stated that a sufficient number of proxies have already been received for the approval of the proposed consolidation with the Nevada Consolidated company.

New Jersey

Pahaquarry Copper Mining Company—This company, which has been reopening the old copper mine at Pahaquarry on the Delaware in Warren county, is now under the control of parties in Allentown, Penn., who have purchased the interest formerly owned by H. D. Deshler, of Belvidere, N. J. Work is going on steadily at the mine.

United States Metals Refining—The company has purchased a plot of 12 acres near the copper refinery at Chrome. It was reported that this ground was to be used for a new plant for refining lead bullion, but the company denies any immediate intention of utilizing the ground for this purpose.

New Mexico

GRANT COUNTY

Chemung—Good ore has been found at the 600-ft. level.

Mangas—The company has commenced drilling. Holes will be put down on every 200-ft. square of the estate.

Azure—This company has acquired 1500 acres more ground in the Burro Mountain district. W. Rogers Wade is engineer.

LINCOLN COUNTY

American—Operations are soon to be resumed at this mine at Nogal.

New York

Harmony—Witherbee, Sherman & Co., have begun work on a new separating plant with a capacity of 1600 tons of ore a day at this mine near Mineville. The plant will be driven by electricity, current being supplied from the power station at Port Henry, six miles distant.

North Carolina

Consolidated Nickel Company—This company is about to start its newly constructed electric smeltery at Webster. The initial power consumption will be 800 h.p. Extension to 6000 h.p. is contemplated. The product will be nickel silicide. It is expected that 27 lb. will be obtained per kilowatt per hour.

Oklahoma

Eastman—The mill at the Baxter-Quapaw camp has inaugurated a complete sizing system whereby the tailings which carry away a large percentage of the metal are now re-run and most of the values recovered. Upon the different cleaning devices only the proper sizes are run, the separating of the different sizes being obtained by a series of screens and hydraulic classifiers which exceed in number those found in any other plant in the district. By this means the ores that are free are taken from the cleaning devices while all the chats are reground and sent back over the jigs or tables. The resulting fines are also carefully classified and treated on separate tables insuring better separation.

Oregon

BAKER COUNTY

National—The company is installing a tube-mill and slime filter at the Cougar mine. The mill capacity is now 80 tons per day.

Independence—The property west of Sumpter is in high-grade ore at the 200-ft. level. W. G. Gleson, manager.

Keystone Dredging Company—Options on the gravel land have been taken and prospecting will be commenced.

GRANT COUNTY

Mollie Gibson—Development is under way on this property on the John Day river.

Blue Bird—Work has been started on this mine belonging to the Consolidated British-American Mines Company.

Hoggard & Niven—An important discovery has been made on the property showing gold-silver-lead ore.

Pennsylvania

ANTHRACITE COAL

Summit Branch Mining Company—This company has finally succeeded in extinguishing the fire which has been burning for eight years in the Big Lick shaft near Williamstown. Recent examination warrants the assertion that the fire is entirely out. The company is putting in new equipment and preparing to reopen the colliery.

Lehigh Valley Coal Company—The Pennsylvania Supreme Court has reversed the decision of the Luzerne county court in the suit brought by H. W. Pierce to recover damages done to his land by culm dumped into the Lackawanna river and carried by that stream into the Susquehanna. The lower court decided in favor of the company because it had not been positively shown that the culm was from its workings. The Supreme Court holds that "it was the duty of the plaintiff to introduce evidence to show to what extent the injury complained of was the consequence of the defendant's action, but it cannot be expected that this can be done with mathematical exactness. Evidence which reasonably tends to support the plaintiff's claim is sufficient."

BITUMINOUS COAL

The mine at Evans station in the Connellsville district, which has been opened by J. W. Buttermore and A. Stickel, has been completed and is now ready to ship coal. It is not proposed to make coke at present. The owners control about 100 acres of coal land.

Rochester & Pittsburg Coal and Iron Company—This company has bought the Seeger farm at Rossmoyne and will use it as the site for a new shaft through which its coal property adjoining can be worked. It is understood that the sinking of the shaft will be begun at once.

South Dakota

Pahasa Mining Company—This company, recently organized, bought in all the property of the Harney Peak Tin

Company, recently sold under foreclosure of mortgage. Development work is now going on in the mines. During the receivership of the Harney Peak company, the big concentrating mill was preserved intact and is ready to be started whenever adequate ore supply is assured.

Tennessee

JEFFERSON COUNTY

New Market District—Drilling is to be started in several points in this district. On the Gardner farm J. T. Williams is prospecting, and on the Taylor farm and the Gillespie place exploration is being carried on by E. E. Wooten.

Grasselli Chemical Company—This company is mining zinc carbonate at New Market under a lease of the New Market Zinc Company and shipping regularly.

Tennessee Mineral Company—The company is enlarging the milling facilities at New Market, and has installed a Lidgerwood cable from the mine to the mill, which will materially reduce the costs of handling the zinc ore.

Jefferson Zinc Company—Successful results from development have been obtained on the 60-acre tract, bought by this company. Arrangements for a hoisting plant are being made.

Utah

BEAVER COUNTY

Cactus—The mine will resume operation in November. The new company will take over the property and pay off the debts incurred in remodeling the mill and the mine will soon be put on a large productive basis.

Frisco Consolidated—A body of lead-silver ore 30 in. thick has been encountered. The crosscut in the 600-ft. level is also in mineral bearing ground. D. P. Rohfling, manager.

JUAB COUNTY

Raymond-Illinois—The work of developing is at 1500 ft. The company is using diamond drills below this level, thus avoiding the installation of a pump.

Tintic Central—A contract has been let for sinking the shaft below 450 ft. to explore for the Iron Blossom vein at 500 ft A new pump has been ordered.

West Dip—The mine after being closed for twelve years has been reopened. The new slime process, so successful at the Consolidated Mercur and Boston-Sunshine, makes it possible to work the West Dip with profit.

Tintic Standard—The 600-ft. shaft has been completed. Prospecting is being done to determine whether to continue the shaft or drift from present depth. E. J. Raddatz, manager.

SUMMIT COUNTY

Iowa Copper—Shipments will be discontinued during the winter months. Low metal prices and difficulty in transportation from mine to railroad in winter are given as reasons. A. M. Spooner, manager.

Daly Judge—The drain tunnel has been connected with a back crosscut making much easier access to workings. The connection also drains and ventilates the mine.

Washington

OKANOGAN COUNTY

Apex—This mine has begun shipping from the 286-ft. level.

Grant—Work has been resumed at Copper mountain.

Copper World Extension—Bids are being received for a tram, electric plant and mill.

STEVENS COUNTY

Northport Smeltery—The plant is to be enlarged and a refinery added. When the addition is completed, 800 men will be employed.

Oriole—The company will install a hoist and 3-drill compressor and pump to lift 500 feet.

Neglected—Ten tons a day is being sorted for shipment. The property is near Colville. A. W. Miles, manager.

YAKIMA COUNTY

North Yakima—E. F. Wright will erect a stamp mill on a new gold strike near Mt. Adams.

Wyoming

CARBON COUNTY

Aetna—After five years' suspension, work has been resumed on the mine in the Encampment district. The shaft is down 220 ft. and over 1000 ft. of development has been completed. Julius Thielman, Merrill, Wis., is president of the company.

SHERIDAN COUNTY

Utah-Wyoming Consolidated—This company has been incorporated to develop the oil lands in Big Horn basin. It owns 5000 acres on the three anticlines of Big Horn basin. Three wells sunk through only the first two strata of oilsand have a capacity of 20 bbl. per day. The new company will install drilling and pumping machinery and contract for its product.

Canada

BRITISH COLUMBIA

Velvet—Edward Ehrenberg, of Spokane, Wash., formerly superintendent of the Tiger-Poorman, has leased the Velvet mine, near Rossland. This mine was worked in 1901-3 by an English company; and shipped about 6000 tons of good-grade copper ore. Amalgamation with the adjoining Portland property took place in 1904, a concentrating plant costing $25,000 was put in, and 150 tons of concentrate shipped that year. With the exception of 249 ft. of development work in the spring of 1906, nothing has since been done on the Velvet. The mine is opened to the 800-ft. level.

NEW BRUNSWICK

New Brunswick Petroleum Company—No. 5 well on the McClusky farm, near Hillsboro and 12 miles from Moncton, has struck a heavy flow of gas. The company has spent a large amount of money prospecting this tract, and this discovery of gas is taken as an indication that oil will be found at depth.

NOVA SCOTIA

Dominion Iron and Steel Company—Contracts have been closed by this company with the Canada Foundry Company, of Toronto, for an additional blast furnace, two new open-hearth furnaces of special type, each with a capacity of 500 tons daily, and an extension of the bessemer plant, including another converter. These contracts involve the expenditure of over $500,000, and it is estimated will double the output of steel. At present, owing to the limited capacity of the open-hearth furnaces, steel cannot be supplied fast enough to keep the mills in continuous operation. Coke ovens to the number of 120, capable of handling 1000 tons of coal per day are now under construction and are expected to be completed by the end of March next. A number of new mills are also in contemplation including a 22-in. plate mill and a new rod mill. A new electric plant will be installed capable of generating 4000 kw. per hour. Recent work has been somewhat interfered with by interruptions in the coal supply, owing to the strike at the mines of the Dominion Coal Company, but coal is now arriving steadily from Philadelphia.

ONTARIO

Lake Superior Corporation—At the annual meeting a contest threatened to develop between the Philadelphia interests in the company and the Anglo-Canadian syndicate which has recently advanced a large amount of money for improvements. After some discussion, however, a compromise was reached and Thomas J. Drummond, of Montreal, who represents the new interest, was chosen president, and J. Tatnall Lea, of Philadelphia, first vice-president. W. K. Wingham and J. F. Taylor were chosen second and third vice-presidents; T. Gibson, secretary and treasurer.

ONTARIO—COBALT

Ore Shipments—Shipments from Cobalt for the week ended Oct. 16, were as follows: Cobalt Central, 44,442; Crown Reserve, 115,420; La Rose, 381,434; McKinley-Darragh, 89,706; Nipissing, 129,402; O'Brien, 64,042; Silver Queen, 58,000; Trethewey, 65,000; Coniagas, 61,700; total, 1,009,146 pounds.

Provincial—Since this mine, lately owned and operated by the Ontario government, was taken over by private parties, a good vein has been found at the 125-ft. level and a strong calcite vein showing smaltite on the surface. Diamond-drill tests have shown good results at 198 feet.

Shamrock—In drifting on the 200-ft. level, a wide vein, 5 in. wide, has been encountered carrying native silver, the discovery being shortly followed by the finding of another vein of good quality, about 4 in. wide.

Little Nipissing—The shareholders at a meeting held in Toronto, Oct. 20, indorsed the recommendations of the directors to increase the capital by $500,000. Shareholders will be offered the opportunity to take up 250,000 of the new shares at 20c. per share.

Kerr Lake—The directors have announced the increase of the quarterly dividend, due Dec. 15, to 4 per cent. regular and 3 per cent. bonus, thus placing it on a 28 per cent. instead of 26 per cent. basis.

Coniagas—This company has decided to resume the regular quarterly dividend of 3 per cent. The last quarterly due Aug. 1 was passed to raise funds to complete the company's smeltery at Thorold, and to increase the mill capacity at Cobalt.

Cobalt Lake—Another high-grade vein, about 6 in. wide, was encountered on the 190-ft. level.

ONTARIO—SOUTH LORRAIN

Weltlaufer—Rich ore has been taken out at the 110-ft. level, samples showing upward of 8000 oz. silver.

Newman—Trenching to the extent of 400 ft. has disclosed a rich vein 18 in. wide in places and carrying native silver.

Keely—The property, in the South Lorrain district, has shipped two cars of medium-grade ore.

Haileybury Silver—The company has declared a 50-per cent. dividend from the funds resulting from the sale of the south half of one of its lots in South Lorrain.

Mexico

CHIHUAHUA

Hinds Consolidated—A committee of the bondholders which has been investigating the property at Parral has recommended foreclosure to protect the interests of the creditors and bondholders.

Esmeralda-Parral—The company is having plans made for a 100-ton concentrator plant. There are five shafts on the mine which develop it to a depth of 300 ft. The stock of the company is held largely in Philadelphia.

Encinillas Mining and Smelting Works, Ltd.—This company, operating a 150-ton lead smeltery at Santa Rosalia, will determine among other matters at its annual meeting in Paris, in November, the advisability of increasing the plant. J. L. St. Dizier is in charge.

Uruachic—John J. Watterson and associates are carrying on successful operations in this old camp in the Sierra Madre mountains at the San Martin. The ores are concentrated and then roasted in wood-burning reverberatory furnaces.

Lluvia de Oro—The concentrating plant has been in operation at about 50-ton capacity since August. A hydroelectric plant is being erected.

Ricamole—This Parral company is to resume work.

GUANAJUATO

Proprietary Mines Company—The company has acquired a control of the stock of the Mineral Development Company. Carl Henrich will remain as manager, and the development be continued.

Guanajuato Amalgamated Gold Mines—Plans are nearly completed to discharge the receiver in compliance with the court conditions. The reported deal for consolidation with the Guanajuato Development Company is denied.

Guanajuato Consolidated—The September crushing was 7407 tons of dry ore; estimated bullion produced 50,850 pesos; concentrates, 51,000 pesos; total 101,850 pesos. Profit, estimated, 33,350 pesos. A decrease for the month is due to a cavein.

HIDALGO

La Blanca—The reported negotiations of the Exploration Company, of London, for this mine are without foundation in fact.

JALISCO

Lupita—Work in the Lupita mines, Mascota, has been resumed and hoisting and drilling machinery is being installed.

El Favor—The company has placed an order for electrical equipment for its mill now completed. The mine is in condition for stoping.

Carrizo—The custom smeltery at Ayutla will be soon blown in. The plant has been idle for months. The company has been developing the San Felipe mines near Ayutla.

Navidad Mines and Reduction Company—The last payment on the price of 300,000 pesos for the properties at San Sebastian, has been made. A modern plant will replace the present works.

Magistral-Ameca—A 100-ton plant using the Elmore flotation process, instead of a reverberatory smelter, will be installed at the Magistral mines, Ameca.

MEXICO

El Oro—The September crushing was 24,536 tons, yielding bullion, $207,790. The mine profit was $73,120, and the railway profit, $10,000.

Mexico Mines of El Oro—The mill crushed 11,200 tons in 30 days, yielding bullion, $106,630, with a net profit of $54,820. In addition, 20 tons of ore yielded net $2150. Approximately $12,700 was spent in development.

OAXACA

Escuadra—This mine in Taviche reports the discovery of a new vein three meters wide.

Soledad—Construction has begun on a 10-stamp mill at the mine in Totolapam.

Rico Seco—The installation of the 5-stamp mill is progressing rapidly. The plans allow for another similar battery. Amalgamation only is used.

SINALOA

El Arco—The company is developing extensively at San Bartolo, Copala. Olof Zetterlund, manager.

SONORA

La Artemisa—A small force is developing the property near Huepac under contract with A. G. Wilcox and C. A. Parker, of Denver.

San Lorenzo—A second payment has been made on this mine 15 miles east of Huepac by John A. Rice, of El Paso.

Washington—About 40 men are at work on this mine near Huepac, proving up a good orebody. Bostwick & Dickson of Huepac are in charge.

San Ignacio and El Olvido—These properties at Tabatacochi are shipping to Douglas. This ore goes out via Calabasas.

Monte Negro—The company operating the Esperanza gold mine 10 miles west of Nacozari is working 40 men and considering a concentrating plant for base ores. Charles E. Le Paige, manager.

Silver Seal—The company has ceased operations on the Silver Hill and El Aguaje at Nacozari, and has turned them over to F. O. Colson on a lease.

Pacific Smelting and Mining Company—This corporation, with $8,000,000 capital, will take over the Theodore Douglas properties in Mexico, included in the Mexican Mining and Exploration Company.

Asia

Kolar Goldfield—Gold production in September is reported at 47,274 oz. bullion, being 236 oz. more than in August. For the nine months ended, Sept. 30, the total was 408,404 oz. bullion in 1908, and 415,137 oz. in 1909; an increase of 6733 oz. The bullion reported this year was equal to $67,722,785, or 373,623 oz. fine grade. The report includes two new mines outside of the district, the Hutti Nizam and Dharwhar Reefs in the Deccan.

Australia

Gold production in Queensland in September is reported at 38,600 oz., or $797,862 in value.

South America

CHILE

Braden Copper Company—A contract for 100 Frue vanners for the mill at La Junta has been let.

COLOMBIA

Gualcala Mining Company—A contract for a sectionalized cyanide plant including stamps and tube mills has been let in San Francisco. The weight limit is 200 lb. for any piece, hence the cam shafts are made hollow.

Metal, Mineral, Coal and Stock Markets

Current Prices, Market Conditions and Commercial Statistics of the Metals, Minerals and Mining Stocks

QUOTATIONS FROM IMPORTANT CENTERS

Coal Trade Review

New York, Oct. 27—The coal trade generally is gaining, but prices have advanced very little, owing to the readiness of the mines to increase their production on the slightest provocation. In the East the bituminous trade is making some gains, and business is better than it has been through the summer. The anthracite trade has been helped a little by cold weather and is in good condition.

In the West also domestic trade has been decidedly boosted by cold weather and is active over a large part of the consuming territory. Steam-coal trade continues good and on a steadily increasing scale. The mines, however, stand ready to take advantage of the least increase in demand, and at some of the consuming centers there is more or less complaint of oversupply.

The coke trade is in a booming condition, demand and prices increasing rapidly, as is shown in our local report from the Connellsville region.

Exports to Nova Scotia—Dealers report some shipments of bituminous coal from the United States to Halifax and other points in Nova Scotia. This is a result of the short production in that province, due to the strike at the Cape Breton mines.

Coal Traffic Notes

Coal and coke tonnages originating on Pennsylvania railroad lines east of Pittsburg and Erie, year from Jan. 1 to Oct. 16, short tons:

	1908.	1909.	Changes
Anthracite.....	4,043,329	3,812,928	D. 230,401
Bituminous.....	26,334,082	28,973,166	I. 2,639,084
Coke.....	5,456,059	8,637,449	I. 3,181,390
Total.....	35,833,470	41,423,543	I. 5,590,073

The total increase this year to date was 15.6 per cent.

Coastwise shipments of coal from principal Atlantic ports, eight months ended Aug. 31, long tons:

	Anthracite.	Bitum.	Total.	PerCt.
New York....	9,455,173	6,851,981	16,307,154	61.2
Philadelphia	1,295,807	3,027,376	4,323,183	16.2
Baltimore....	152,408	2,244,771	2,397,179	9.0
Newp't News	.....	2,260,986	2,260,986	8.5
Norfolk.....	.....	1,356,734	1,356,734	5 1
Total.....	10,903,388	15,741,848	26,645,236	100.0
Total, 1908.	11,441,952	14,881,373	26,323,325	.....

Total increase this year, 321,911 tons, or 1.2 per cent. New York includes all the New York harbar shipping points.

Coal receipts at St. Louis, eight months ended Aug. 31, were 4,196,983 short tons in 1908, and 4,118,563 in 1909; decrease, 78,420 tons.

Shipments of Broad Top coal over the Huntington & Broad Top railroad, nine months to Oct. 1, were 466,376 tons in 1908, and 334,602 in 1909; decrease, 131,774 tons.

Coal shipments by water from Seattle and Tacoma, eight months ended Aug. 31, were 386,419 tons in 1908, and 233,378 in 1909; decrease, 153,041 tons.

Coal passing Davis Island dam on the Ohio, eight months ended Aug. 31, was 1,721,514 short tons in 1908, 2,360,370 in 1909; increase 638,856 tons.

Coal passing through the locks on the Monongahela above Pittsburg, eight months ended Aug. 31, was 5,314,980 short tons in 1908, and 6,140,520 in 1909; increase, 825,540 tons.

Receipts of domestic coal at San Francisco, eight months ended Aug. 31, were 301,018 tons in 1908, and 203,239 in 1909; decrease, 97,779 tons.

Bituminous coal and coke shipments, Pennsylvania and West Virginia, eight months ended Aug. 31, short tons:

	Coal.	Coke.	Total.
Balt. & Ohio.....	14,453,912	2,881,806	17,335,718
Buff., Roch. & Pitts.	4,148,306	304,115	4,452,421
Buff. & Susqueh'na	936,937	216,568	1,153,505
Penn. lines, N. Y. C.	4,587,948	62,827	4,650,775
Pitts. & L. Erie.....	5,932,522	3,269,786	9,202,308
Norfolk & Western.	8,771,320	1,622,707	10,394,027
Ches. & Ohio.....	8,502,254	300,392	8,802,646
Total.....	47,333,199	8,658,201	55,991,400
Total, 1908.....	41,162,609	5,390,706	46,553,315

Total increase this year 9,438,085 tons, or 20.3 per cent. In addition to the above, the Baltimore & Ohio carried 485,177 tons anthracite in 1908, and 500,431 in 1909; increase, 15,254 tons.

Coal tonnage of railroads in Ohio Coal Traffic Association, eight months ended Aug. 31, short tons:

	1908.	1909.	Changes.
Hocking Valley.....	1,853,956	1,834,049	D. 19,907
Toledo & Ohio Cent..	896,630	802,838	D. 93,792
Baltimore & Ohio....	903,357	911,615	I. 8,258
Wheeling & L. Erie..	1,732,692	1,955,357	I. 222,725
Cleve., Lorain & Wh.	1,568,090	1,527,689	D. 40,401
Zanesville & Western	742,411	683,448	D. 58,963
Toledo Div., Pen. Co.	981,681	1,149,708	I. 168,027
L. Erie, Alliance & Wh.	618,183	644,470	I. 26,287
Marietta, Col. & Clev.	29,449	50,630	I. 21,181
Wabash-Pitts. Term.	.....	15,756	I. 15,756
Total.....	9,326,389	9,575,560	I. 249,171

The total increase in tonnage this year was 2.6 per cent. Only the Ohio lines of the Baltimore & Ohio are included above; the main line is given elsewhere.

New York

Anthracite

Oct. 20—The effect of the cold spell is showing a little this week in the wholesale trade. Shipments are increasing, and more collieries have been put on full time. From now on the market will probably be steady.

Sshedule prices for large sizes are unchanged at $4.75 for lump and $5 for egg, stove and chestnut, all f.o.b. New York harbor. For steam sizes quotations are: Pea, $3.10@3.25; buckwheat, $2.25@2.50; No. 2 buckwheat or rice, $1.75@2; barley, $1.35@1.50; all f.o.b. New York harbor.

Bituminous

Soft coal again continues to be taken more freely. The Sound is doing pretty well, and New York harbor is better than it was, while the shoalwater ports are rubbing their eyes and beginning to hustle a little under the influence of a few sharp frosts. All-rail trade has been pretty steady. While no boom is in sight, producers are beginning to feel a little better.

Prices are about the same. Dealers are talking of 5c. and 10c. advances, but they have hardly materialized so far, except for a few special coals.

Car supply continues to trouble shippers, although the railroads promise to improve conditions. It is no longer possible for a shipper to secure all the cars he wants and this must be taken into account in calculating the time within which orders can be filled. Transportation is generally fair, and cars come through in about schedule time. Few shippers have any considerable stocks at tidewater, the trade continuing in this respect as it has been for six months past.

The usual fall advance in cargo rates has not arrived yet and coastwise rates continue low and unchanged. New York quotes on small vessels 50c. to points around Cape Cod, with 5c. or 10c. more for a few special points. Philadelphia reports 60@65c. for large boats to Boston, Salem and Portland.

Birmingham

Oct. 25—Three new coal mines, plans being drawn for extensions at present collieries and the construction of some new coal tipples is a report gathered from the coalfields of Alabama. Two new coal companies were organized during the past week and it was given out that each would open a new mine. Then it was announced that the Tennessee Coal, Iron and Railroad Company has plans in hand for the opening of a new coal mine in the western part of Jefferson county. The coal production in this State is only held back by the railroads, which are not able to furnish all the cars that are needed, and by scarcity of labor. Some excellent contracts are in hand, it is announced,

which means that the production is to be kept up for some time to come. The greater amount of the coal mined now is used in the home territory, but some is shipped to Louisiana and Mississippi points.

Coke is in strong demand. Virginia producers of coke are making a bid for trade in this State and it may be necessary to resort to that section for a supply.

Chicago

Oct. 25—General conditions in the coal trade are bettering, there being little surplus on tracks from western mines, while the tendency of prices is upward. In some cases shortage of cars has caused the lessened supply; this, however, would be a benefit to the local trade if it could prevail generally long enough to raise prices, and then modify to the extent of keeping off the market the aggregations of shipments that chronically cause demurrage sales. Generally speaking, there does not yet seem to be any injurious car shortage, but apprehensions of a shortage are common in the trade. Sales of both steam and domestic coals are large and increasing. Fine coals have become weak, and lump continues to grow stronger.

Illinois and Indiana coals, the chief supply of the market, bring $1.75@2.75 for lump, $1.65@1.75 for run-of-mine, and $1@1.20 for screenings.

Hocking is strongest of the coals from east of Indiana, bringing the full circular price, $3.15. Smokeless alone of the Eastern coals shows something of oversupply and sells for $3.40@3.65, lump and egg, and $2.95@3.05 for run-of-mine. Pittsburg No. 8 at $2.55 and Youghiogheny gas at $3.15 for ¾-in. in each case, are steady. Anthracite is selling well in both city and country.

Cleveland

Oct. 26—There is a rush on in the Lake trade. Steam trade is steady, and domestic trade has been started up actively by the cold weather. Car supply is becoming a serious question.

Middle-district coal is $1.90@2 for lump; $1.80@1.85 for nut; $1.70@1.75 for run-of-mine; $1.25 for slack, all f.o.b. Cleveland. No. 8 district brings about 15c. more for all grades. Pittsburg is quoted $2.25@2.35 for lump; $2.10@2.15 for nut; $2@2.05 for run-of-mine; $1.40 @1.50 for slack. Pocahontas is $3.05 for lump and $2.35 for run-of-mine, f.o.b. Cleveland.

Indianapolis

Oct. 26—The coal trade continues good, both in steam and domestic lines. Mine operators, however, are limited in shipments to some extent, as cars are not so easy to get. There is hardly a general shortage yet, but the railroads are careful in allotting cars.

Pittsburg

Oct. 26—About 2,000,000 bu. of coal were sent down the river yesterday, on the first rise since June. There is not a shipping stage today, but some empties will be brought back. There has been no material change in the coal market since last report, when we noted an advance of about 5c. a ton. Mine-run is quotable at $1.10 at mine, but there is frequent cutting to $1.05. Slack is 60@65c. at mine.

Connellsville Coke—A contract for 10,000 to 12,000 tons of furnace coke monthly over the first half of the year has just been made at $2.90, which has been the regular price for more than a month, although about three weeks ago there was a little flurry in which this figure was shaded 5c. or 10c. on a few contracts. Generally speaking, the tone of the market is unchanged, but it is probably not altogether as strong as it was, there being less hope than there was of prices getting well above $3 on contracts for next year. Prompt coke is a trifle easier, and whereas $3 was being demanded for December coke, it is now possible to buy coke for delivery through December at $2.85, with occasional spot lots going at a trifle less.

We quote prompt and near-by furnace coke at $2.75@2.85, and contracts for first half or all of next year at $2.90, with 72-hour foundry coke at $2.75@3 for this year and $3.25@3.50 for next year.

The *Courrier* reports the production in the Connellsville and lower Connellsville region in the week ending Oct. 16 at 427,313 tons, a decrease of 10,000 tons from the previous week; shipments at 5067 cars to Pittsburg, 7888 cars to points west of Pittsburg and 845 cars to points east of Connellsville, a total of 13,800 cars.

St. Louis

Oct. 25—The weather this week has been unusually warm which has checked the flow of retail orders. Householders have been unusually late in ordering this year and laying in their supply until actually forced by the weather. This has had a perceptible effect on the wholesale market and Standard coal has been very hard to move all week. This has had no effect on the high-grade mines whatever as they were already far behind with orders. The country trade has served to bolster up the market again and orders are coming in freely from all directions. Six-inch lump of all grades is consequently moving freely though 2-in. lump and steam sizes are dragging.

Carterville 6-in. lump has advanced slightly and the price is $1.75 at mine or $2.42 St. Louis. No. 1 nut has also advanced and is in better demand that at any time this year. It is bringing $1.30 at mine or $1.97 St. Louis. Screenings are about 35c. at mine or $1.07 St. Louis.

Franklin county coal has also advanced and is being quoted at $1.90 at mine or $2.57 St. Louis for 6-in. lump or egg. It is scarce at even that figure. Nut coal is bringing about $1.40 per ton at the mine or $2.07 per ton St. Louis. The famous Trenton coal of which only a small tonnage is being produced now, is $2.25 at mine or $2.77 St. Louis for 6-in. lump.

Staunton, Mt. Olive or Springfield district coals are strong at $1.50 at mine or $2.02 St. Louis for 6-in. lump; $1.25 at mine or $1.77 St. Louis for 2-in. lump. Nut coal is about 85c. at mine or $1.37 St. Louis. Standard 6-in. lump is $1.20 at mine or $1.72 St. Louis and 3-in. lump is $1 at mine or $1.52 St. Louis; 2-in. lump is 5c. less. These two sizes are not moving as freely as could be desired. Domestic roller screened nut coal is 75c. at mine or $1.27 St. Louis, while steam nut is freely offered at 40@50c. at the mines or 0.92c.@$1.02 per ton St. Louis. Screenings have at last gotten to a point where they are being given away for the freight. Those who think they have screenings a little better than the average are asking the princely sum of 10c. per ton at the mine for them.

Washed coal is very slow this Fall and outside of No. 1, which is moving to the domestic trade, washers are all complaining that business is very bad. Washed Carterville No. 1, is bringing $1.75 at mine or $2.42 St. Louis. Standard washed coal is bringing about 25c. per ton less than Carterville.

The demand for hard coal is exceptionally strong and spot coal is at a premium. Chestnut and egg are short. The demand seems to be quite a bit ahead of the supply at present.

Foreign Coal Trade

British Coal Trade—Exports of fuel from Great Britain, nine months ended Spet. 30, with coal sent abroad for use of steamships in foreign trade, long tons:

	1908.	1909.	Changes.
Coal	46,579,700	46,777,014	I. 197,314
Coke	817,082	830,966	I. 13,884
Briquets	1,136,691	1,115,658	D. 21,033
Total exports	48,533,473	48,723,638	I. 190,165
Steamer coal	14,490,794	14,642,879	I. 152,085
Total	63,024,267	63,366,517	I. 342,250

The larger exports this year were 7,808,275 tons to France, 7,086,304 to Germany, 6,804,888 to Italy and 2,771,124 to Sweden.

German Coal Trade—Exports and imports of coal in Germany, eight months ended Aug. 31, metric tons:

	Exports.	Imports.	Excess.
Coal	14,785,681	7,509,458	Exp. 7,276,223
Brown coal	22,374	5,395,196	Imp. 5,372,822
Coke	2,209,340	439,503	Exp. 1,769,837
Briquets	1,028,919	133,101	Exp. 895,818
Total	18,046,314	13,477,258	Exp. 4,569,056
Total, 1908	16,986,077	13,819,430	Exp. 3,166,647

Of the exports this year, 28,410 tons of coke went to the United States.

German Fuel Production—Coal production of German Empire, eight months ended Aug. 31, metric tons:

	1908.	1909.	Changes.
Coal	98,611,055	97,895,931	D. 715,124
Brown coal	43,168,329	43,887,316	I. 718,987
Total mined	141,779,384	141,783,247	I. 3,863
Coke made	14,097,385	13,991,259	D. 106,126
Briquets made	11,996,884	12,205,417	I. 208,533

Of the briquets reported this year 9,687,892 tons were made from brown coal or lignite.

Austrian Coal Production—Coal production of Austria-Hungary, eight months ended Aug. 31, metric tons:

	1908.	1909.	Changes.
Coal	9,475,527	9,260,312	D. 215,215
Brown coal	17,801,795	16,966,201	D. 835,594
Coke	1,269,229	1,231,826	D. 37,403
Briquets	98,813	116,876	I. 18,063

The output of brown coal, or lignite, largely exceeds that of bituminous coal.

Transvaal Coal—The total coal mined in the Transvaal for the eight months ended Aug. 31, was 3,240,121 tons. The coal sold and shipped was 2,365,945 tons. The balance was used for fuel at mines, or sorted and screened out as waste.

Welsh Coal Market—Messrs. Hull, Blyth & Co., London and Cardiff, Wales, report prices of coal as follows on Oct. 16: Best Welsh steam, $4.14; seconds, $3.90; thirds, $3.72; dry coals, $4.02; best Monmouthshire, $3.48; seconds, $3.36; best small steam, $2.16; seconds, $1.68. All prices are per long ton, f.o.b. shipping port, for cash in 30 days, less 2½ per cent. discount.

Iron Trade Review

New York, Oct. 27—The iron and steel markets continue in an active condition in almost all lines. In some cases where buying has fallen off, it is due to the fact that manufacturers have supplied their wants well over the first quarter of next year and are not yet ready to go much beyond that.

In pig iron the Central West continues to show a heavy demand for bessemer pig and one almost as heavy for basic iron. Steel companies are hardly able to supply their requirements from their own blast furnaces and are looking for considerable quantities from the merchant stacks. In the East sales of foundry iron continue on a good scale, and the demand for basic pig has sprung up again. Some large sales of Alabama basic are reported at $14.50 @15 at furnace. Virginia foundry and basic iron have been pretty well sold out for some months to come. Cast-iron pipe makers have taken some large quantities of low-grade foundry and forge iron for 1910 delivery. The fact that some of them were reported to have placed orders for Middlesboro pig in England has made furnaces here willing to accommodate so far as prices are concerned.

In finished steel orders continue large. Structural steel is quieter than it has been, but the demand for bars, sheets and small material generally is heavy. The railroad companies have placed some large orders for new freight cars, the total within the last 10 days amounting to something like 11,000 cars. The Lake ship-building companies have also taken several contracts for large freighters to be built during the winter. Combined, these orders will make a heavy demand for plates and shapes. As a general rule the mills are full of orders, and will not be able to make prompt deliveries. Already talk of premiums for early deliveries is heard, and this will probably increase.

United States Steel Corporation—The report for the quarter ended Sept. 30 gives the following figures, the net earnings being the excess over all expenses, repairs and maintenance:

	1908.	1909.
July	$ 8,599,630	$12,530,770
August	9,152,311	12,437,754
September	9,354,333	13,278,383
Net for quarter	$27,106,274	$38,246,907
Depreciation, reserve funds, etc		$7,391,888
Interest and sinking funds		7,506,096
Total charges		$14,703,85
Surplus for the quarter		$23,543,057
Dividends		$11,387,914
New construction		10,000,000
Total appropriations		$21,387,944
Balance		$ 2,155,113

Dividends declared were 1¾ per cent. on preferred stock—$6,304,919—and 1 per cent. on common stock—$5,083,025. The common-stock dividend is an increase of ¼ per cent. over that for the June quarter, and of ½ per cent. over that paid for a series of quarters previously. The appropriation for new construction is the first made since 1907. The unfilled orders on the books Sept. 30 reached a total of 4,796,833 tons, an increase of 738,894 tons over June 30 last, and 1,374,856 tons over Sept. 30 of last year.

Baltimore

Oct. 26—Exports for the week included 511,724 lb. tin-scrap to Rotterdam; 2000 tons steel rails to Brisbane, Australia; 1261 tons rails and 101 tons rail fastenings to St. John, N. B.; 980,502 lb. structural steel, 215,500 lb. steel plates and 289,857 lb. miscellaneous steel to Panama. Imports included 11,000 tons iron ore from Cuba, and 3655 tons cupreous pyrites from Huelva, Spain.

Birmingham

Oct. 25—The Southern pig-iron manufacturers are receiving a steady line of inquiries and are closing some sales for delivery during the first half of the coming year. The greater amount of business is for the first-quarter delivery, two or three furnace companies abstaining from the market on the second quarter in the expectation of a further advance in quotations, over $15 per ton, No. 2 foundry, which is the basis of the business that is now being booked. Nothing under that price is to be heard. Another furnace belonging to the Southern Iron and Steel Company (Chattanooga, Tenn.) will be making iron before the end of this week. There is a belief that all the iron that can possibly be manufactured in this section will be needed. The fact that some of the manufacturers are selling into the second quarter of the coming year has allowed kindred interests, such as the cast-iron pipe makers, to begin preparing for the business of the coming year. The pipe demand has been good right along, the prices advancing as the iron went up.

Chicago

Oct. 25—A condition of steady sales of fair amounts, but no rush for supplies, seems to have settled upon the iron market. Pig iron is firm and the belief is expressed by both melters and sales agents that prices will not lower. Foundry outputs continue large despite some lessening of productive capacities owing to labor conditions, and seem bound to continue large. Generally increased production of Northern pig iron has not affected the ready sale from Northern furnaces, No. 2 foundry bringing $19@19.50. Southern holds to $15 Birmingham ($19.35 Chicago), with some sales at $15.50 and occasionally a small lot sold under favorable conditions of an early delivery at $14.50. The greatest number of sales is for first-quarter delivery, but many extend over the first half. No general disposition exists to run into third-quarter contracts yet, but second-quarter sales are steadily increasing. The average sale continues to be 300 to 800 tons, with occasionally a transaction running into the thousands, and buying is very generally distributed. On the whole, the market appears to be healthy, though quiet.

Iron and steel products share something of this quiet but firm tone. Sales are of medium volume throughout practically every branch of the trade. Coke is unchanged, selling well at $4.85 per ton.

Cleveland

Oct. 26—Already there is talk of ore prices for next season, but sellers are not disposed to do anything yet.

Pig Iron—New buying is lighter on all grades, but furnaces are holding prices firmly. Bessemer is quoted $19.25@19.50; No. 2 foundry, $18.25@18.50; gray forge, $17@17.25; No. 2 Southern, $18.85, Cleveland.

Finished Material—New sales are lighter, but specifications on contracts are heavy, and the mills are quite contented with the situation. Quite a demand for light rails has developed, especially for mining purposes.

Philadelphia

Oct. 27—The pig-iron market continues strong, though new sales have been fewer. Most large consumers are provided for the first quarter and sellers are not willing to go much beyond that, except at prices which buyers do not want to give. Small orders continue to come in. For No. 2X the general quotation is $19@19.50, with makers talking of $20 for second quarter. Some business has been done in basic at $18.50@19, and in forge at about $17.50. The tone is strong.

Steel Billets—Only small sales reported. As high as $29@30 has been named, the higher range for next year. Forging steel is quoted $32 on small lots.

Bars—Steel bars are scarce, which has turned some business to iron. Steel bars are 1.65c.; refined iron, 1.60@1.70c. Store trade is heavy.

Sheets—Mills are full for this year, but do not want to quote on 1910 deliveries, though there are plenty of inquiries. No. 28 gage is 2.90c., with a premium for extended deliveries.

Plates—A good many orders are coming out. For delivery up to December, 1.70@1.75c. are the quotations; for next year mills want more.

Structural Material—No heavy contracts are reported, but small orders are coming in. Mills are holding back on 1910 orders, as with other material.

Scrap—The market is still quiet and prices are rather nominal. Stocks are not heavy, and yardmen are sitting on their piles, confident of good prices soon, when demand looks up.

Pittsburg

Oct. 26—The quieter condition in the iron and steel trade noted in last report has been intensified. The market has become dull and the change has been rather a sudden one. The situation, however, can hardly be considered an unfavorable one because the mills are all very well sold up and the clamor for deliveries is unabated.

An exception to the statement as to a dull market must be made in favor of railroad material. The railroads continue to buy with considerable freedom. They have lately bought liberally in steel cars and rails, and there is more business of this sort in sight. The car plants are booked well ahead, and railroads are urging as early deliveries as possible. The car plants are unable to run full on account of the scarcity of labor and material, particularly the former. The Pressed Steel Car Company has lately increased its operations, and is now making 75 steel cars a day, with the Standard Steel Car Company doing about the same.

Pig Iron—The market has become quiet in all grades. Prices remain firm, but show no marked tendency toward a further advance. Bessemer iron, which was easily the market leader, has quieted down and does not promise much activity for awhile. A sale of 3000 tons was made this week to an eastern interest, for prompt delivery, at the former price of $19, Valley. Basic is quoted at $17.25@17.50, Valley, according to delivery, and foundry iron at the same range. After a long period of quiet, some business in malleable iron came out last week, and a seller was found at $17.50, Valley, not only for this year, but even through the first half of next year.

Steel—Unfinished steel has become scarcer than it was and the market is more interested in finding steel than in determining the price. It can be quoted largely nominal at $26@26.50 for bessemer and $27 for open-hearth billets, with sheet-bars $28@28.50 and rods at $32, all at maker's mill, Pittsburg district.

Ferromanganese—Prices are strongly held, with prospects of an advance before long. We quote prompt at $43, November and December at $43.50@44, and first quarter and half at $44.50@45, all f.o.b. Baltimore, the freight to Pittsburg being $1.95 per ton.

Sheets—Mills are booked pretty fully through this year, and while they are selling for first quarter they are rather conservative about booking contracts. The sharp rise in spelter has made the situation serious for the galvanized trade, as the advance in galvanized sheets since last spring is quite insufficient to cover the advance in spelter in the same period. The market is firm at 2.30c. for black and 3.35c. for galvanized sheets, 28 gage, with corrugated roofing at $1.60 a square for painted and $2.85 a square for galvanized.

St. Louis

Oct. 25—The iron demand is continually increasing. Some large orders have been placed this week for delivery during the first quarter and first half of next year. Buying is almost exclusively confined to deliveries for the second quarter, as the available supply for the first quarter is practically all sold up. A number of foundries find that they are running short and are asking producers to accommodate them by letting them have small shipments on orders during December. All industries using pig iron seem to be running full blast now. A number of inquiries have been received from the far West and Southwest which as a rule do not buy from this market. The present price is $15@15.25 per ton Birmingham or $18.75 @19.25 St. Louis.

Sault Ste. Marie Canal Traffic

The total freight passing through the Sault Ste. Marie canals for the season to Oct. 1 was as follows, in short tons:

	1908.	1909.	Changes.
East-bound	18,884,150	30,957,325	I. 12,073,175
West-bound	7,841,112	8,082,123	I. 241,011
Total	26,725,262	39,039,448	I. 12,314,186

The mineral freights included in the totals were as follows, in short tons, except salt, which is in barrels:

	1908.	1909.	Changes.
Coal	7,113,704	7,038,798	I. 74,906
Iron ore	16,127,105	28,107,722	I. 11,980,617
Pig and man. iron	191,885	345,361	I. 153,476
Copper	64,841	79,891	I. 15,050
Building stone	1,019	1,129	I. 110
Salt, bbl.	406,504	483,967	I. 77,463

Iron ore was 72 per cent. of the total freight this year, and coal 18 per cent.

Metal Markets

New York, Oct. 27—The metal markets generally show little change from last week. Prices are rather irregular, weakness in some directions being balanced by strength in others.

Gold, Silver and Platinum

UNITED STATES GOLD AND SILVER MOVEMENT

Metal.	Exports.	Imports.	Excess.
Gold:			
Sept. 1909..	$ 7,546,442	$ 2,350,958	Exp. $ 5,195,484
" 1908..	3,974,391	4,767,051	Imp. 792,660
Year 1909..	97,272,834	31,105,193	Exp. 66,167,641
" 1908..	68,937,380	38,427,973	" 30,509,407
Silver:			
Sept. 1909..	4,385,532	3,261,397	Exp. 1,124,135
" 1908..	4,198,286	3,370,591	" 827,695
Year 1909..	43,289,116	33,240,530	" 10,048,586
" 1908..	38,781,380	30,792,704	" 7,988,676

Exports from the port of New York, week ended Oct. 23. Gold, $220,000; silver, $601,913, chiefly to London and Paris. Imports: Gold, $114,676; silver, $42,217, both from the West Indies, Central and South America.

Foreign commerce of the United States, nine months ended Sept. 30, as reported by the Bureau of Statistics, Department of Commerce and Labor:

Merchandise:	1908.	1909.
Exports	$1,230,767,349	$1,160,811,859
Imports	798,498,168	1,068,518,977
Excess, exports	$ 432,269,181	$ 92,292,882
Add excess of exports, silver		10,048,586
Add excess of exports, gold		66,167,641
Total export balance		$ 168,509,109

The gold and silver movement in detail will be found in the table at the head of this column.

Gold—The demand for gold on the open market in London continued good, but the price was a shade lower at 77s. 11¼d. per oz. for bars. American coin, however, advanced a little, 76s. 5¼d. per oz. being paid. The Bank of England took nearly all the supplies. In New York $950,000 were taken for shipment to Brazil, $100,000 to Hayti and $800,000 to Canada.

Platinum—The market continues very strong, demand being good especially for the jewelry trade. Dealers ask this week as high as $28.50 per oz. for refined platinum, and $32.25 for hard metal. Offers at lower than dealers' rates are not being made.

Our special correspondent writes from St. Petersburg, under date of Oct. 14, that the market has a tendency to still higher prices. The demand is good and some large sales have been made. In St. Petersburg last fortnight some poods were sold at 21,500 rubles per pood. At Ekaterinburg small lots are offered at 5.45 rubles per zolotnik. Generally the prices remain unchanged. The metal is quoted in St. Petersburg at 21,500@21,750 rubles per pood. At Ekaterinburg 5.40@5.45 rubles per zolatnik. The averages of these prices, which are for crude metal, 83 per cent., are $21.19 and $20.40 per oz., respectively.

Silver—Owing to pressure to sell on both China and India bazar account, silver declined to 23 3/16d., with 23 1/16d. the lowest point touched, on Oct. 26. Stocks continue large in the chief silver centers, and no great rise is anticipated.

SILVER AND STERLING EXCHANGE

Oct.	21	22	23	25	26	27
New York....	51	50¾	50¾	50⅛	50	50⅜
London.....	23⅛	23⅜	23⅜	23¼	23 1/16	23 3/16
Sterling Ex..	4.8730	4.8770	4.8750	4.8765	4.8740	4.8715

New York quotations, cents per ounce troy, fine silver: London, pence per ounce sterling silver, 0.925 fine.

Exports of silver from London to the East, Jan. 1 to Oct. 14, as reported by Messrs. Pixley & Abell:

	1908.	1909.	Changes.
India.....	£ 7,349,863	£4,744,900	D. £2,604,963
China.....	516,400	1,555,200	I. 1,038,800
Straits.....	112,385	82,800	D. 29,585
Total.....	£ 7,978,648	£6,382,900	D. £1,595,748

Imports for the week, £10,000 from Mexico and £180,000 from New York; total, £190,000. Exports, £2200 to Port Said and £69,550 to India; £71,750 in all. Inida Council bills in London, 16.0625d. per rupee.

Copper, Tin, Lead and Zinc

Oct.	Copper. Lake, Cts. per lb.	Copper. Electrolytic, Cts. per lb.	Copper. London, £ per ton.	Tin. Cts. per lb.	Lead. New York, Cts. per lb.	Lead. St. Louis, Cts. per lb.	Zinc. St. Louis, Cts. per lb.
21	12⅞ @13¾	12½ @12¾	57⅛	30⅜	4.32½ @4.35	4.20 @4.22½	6.20 @6.25
22	12⅞ @13¾	12½ @12¾	56⅞	30⅜	4.32½ @4.35	4.20 @4.22½	6.22½ @6.27½
23	12⅞ @13¾	12½ @12¾	....	30⅜	4.32½ @4.35	4.20 @4.22½	6.22½ @6.27½
25	12⅞ @13¾	12½ @12⅝	56 7/16	30⅜	4.32½ @4.37½	4.20 @4.25	6.22½ @6.27½
26	12⅞ @13¾	12½ @12⅝	56 1/16	30⅜	4.32½ @4.37½	4.20 @4.25	6.22½ @6.27½
27	12⅞ @13¾	12½ @12½	56⅛	30⅜	4.32½ @4.37½	4.20 @4.25	6.22½ @6.27½

London quotations are per long ton (2240 lb.) standard copper. The New York quotations for electrolytic copper are for cakes, ingots and wirebars, and represent the bulk of the transactions made with consumers, basis, New York, cash. The prices of casting copper and of electrolytic cathodes are usually 0.125c. below that of electrolytic. The quotations for lead represent wholesale transactions in the open market. The quotations on spelter are for ordinary Western brands; special brands command a premium.

Copper—The situation is dominated by the uncertainty of the speculative position in London. The lot of the bull over there has been very hard on account of the ever increasing stocks, and now that money rates have tightened and the Bank of England has raised its discount rate to 5 per cent., a wave of liquidation has spread over the market, which has carried quotations down to a point enabling consumers abroad to buy their electrolytic copper from warehouse cheaper than the lowest prices that have been named here. In our market there have been sales, both of Lake and electrolytic, to a moderate amount during the week Oct. 21-27. While some fancy brands of Lake have sold as high as 13⅛c., good ordinary brands of this grade have been freely offered at 13c. Electrolytic copper has been freely offered at 12¾c., delivered, 30 days, or a little less than 12⅝c., cash, New York. At the decline in price manufacturers on this side appear to be showing some interest, but no one has yet been willing to inaugurate a general buying movement. The market closes uncertain at 12⅞@13⅛c. for Lake copper, and 12½ @12⅝c. for electrolytic copper in cakes, wirebars or ingots. Casting copper is quoted nominally at 12⅜@12⅝ cents.

Copper sheets are 17@18c., base for large lots. Full extras are charged, and higher prices for small quantities. Copper wire is 14½c. base, carload lots at mill. Business continues on a good scale.

The standard market in London has been depressed throughout the week, due to causes as aforesaid, and closes uncertain at £56 10s. for spot, and £57 12s. 6d. for three months.

Refined and manufactured sorts we quote: English tough, £61; best selected, £60@61; strong sheets, £72@73 per ton.

Exports of copper for the week from New York and Philadelphia were 6920 long tons. Our special correspondent gives the exports from Baltimore at 1284 tons of copper.

Tin—The report of smaller shipments from the East than were generally anticipated advanced the London market, which had been rather easy until the beginning of this week. The close is cabled as steady at £138 15s. for spot, and £140 12s. 6d. for three months.

In this market buyers are holding off, and few transactions were made in spot material, which is again selling at a premium, while future deliveries are being offered at below import points. The market at the close is nominal at about 30⅝ cents.

Lead—There has been a slightly better inquiry. The market is somewhat firmer at 4.32½@4.37½c., New York, and 4.20@4.25c., St. Louis.

The London market has been neglected and the close is cabled at £13 2s. 6d. for Spanish lead, and £13 5s. for English lead.

Spelter—Early in the week there was a good deal of speculative participation which carried prices up still further, but at the close the market is quiet, although quotations are well maintained at 6.22½@6.27½c., St. Louis, and 6.37½@6.42½c., New York.

Quotations for spelter in New York on Oct. 21 were 6.35@6.40c.; Oct. 22-27, inclusive, 6.37½@6.42½ cents.

The London market is steady at £23 2s. 6d. for good ordinaries, and £23 7s. 6d. for specials.

Base price of sheet zinc is now 8c. per lb., f.o.b. La Salle-Peru, Ill., less 8 per cent. discount.

Exports and imports of zinc and zinc products in Germany in August are reported as below, in metric tons:

	Exports.	Imports.	Excess.
Spelter and zinc scrap.....	7,242	3,925	Exp. 3,317
Zinc sheets.....	1,534	38	Exp. 1,496
Zinc dust.....	106	42	Exp. 64
Zinc pigments.....	2,126	397	Exp. 1,729

Imports of zinc ore were 20,946 tons, and imports 3104 tons.

Other Metals

Antimony—Business is quieter and prices are unchanged. Cookson's is quoted at 8⅜@8½c. per lb.; Hallett's 8¼@8⅜c.; U. S., 7⅞@8c.; outside brands, 7⅝@7¾c. per pound.

Aluminum—No change is noted. No. 1 ingots are still quoted 20@23c. per lb. in large lots, the higher figure being that named by the American maker.

Quicksilver—Business continues good and prices are unchanged. In New York the quotation is $47@48 per flask of 75 lb., for large lots, while jobbers quote 66@67c. per lb. for small quantities. San Francisco quotations are $46@47 for domestic orders; $2 less for export. The London price is £8 12s. 6d. per flask, with jobbers quoting the same price.

Magnesium—The price of pure metal is $1.50 per lb. for 100-lb. lots f.o.b. New York.

Nickel—Large lots, contract business, 40@45c. per lb. Retail spot, from 50c. for 2000-lb. lots, up to 55c. for 500-lb. lots. The price for electrolytic is 5c. higher.

Cadmium—Current quotations are 75c. per lb. in 100-lb. lots at Cleveland, Ohio. In Germany 450@475 marks per 100 kg., at factory in Silesia.

British Metal Imports and Exports

Imports and exports of metals in Great Britain, nine months ended Sept. 30, figures in long tons, except quicksilver, which is in pounds:

Metals:	Imports.	Exports.	Excess.
Copper, long tons	128,167	46,821	Imp. 81,346
Copper, 1908....	129,674	50,092	Imp. 79,582
Tin, long tons....	31,495	31,462	Imp. 33
Tin, 1908.....	35,664	29,958	Imp. 5,706
Lead, long tons..	154,980	35,715	Imp. 119,265
Lead, 1908.....	176,383	38,728	Imp. 137,655
Spelter, l'g. tons.	82,470	5,827	Imp. 76,643
Spelter, 1908....	79,135	6,173	Imp. 73,962
Quicksilver, lb...	3,056,261	847,537	Imp. 2,208,724
Quicksilver, '08	3,130,466	1,295,071	Imp. 1,835,395
Ores:			
Tin ore and con.	18,005	.....	Imp. 18,005
Tin ore, 1908...	19,298	.....	Imp. 19,298
Pyrites.....	583,921	.....	Imp. 583,921
Pyrites, 1908...	598,015	.....	Imp. 598,015

Copper totals include metallic contents of ore and matte. Exports include re-exports of foreign material. Of the imports in 1909 the United States furnished this year 180 tons copper matte, 50,789 tons fine copper and 25,854 tons lead. This lead was chiefly Mexican, refined in this country.

Zinc and Lead Ore Markets

Platteville, Wis., Oct. 23—The highest price paid this week for zinc ore was $52 per ton; the base price, 60 per cent. zinc, was $49@50 per ton. The base price paid for lead ore was $55@56 per ton.

SHIPMENTS, WEEK ENDED OCT. 23.

Camps.	Zinc ore, lb.	Lead ore, lb.	Sulphur ore, lb.
Benton.....	559,700	157,060	180,900
Highland.....	438,200	.....	.....
Cuba City.....	387,570	225,600	188,000
Platteville.....	379,860	.....	352,000
Hazel Green.....	362,400	88,000	.....
Days Siding.....	165,000	.....	.....
Montfort.....	150,000	.....	.....
Rewey.....	148,800	.....	.....
Linden	130,970	.....	.....
Livingston.....	80,000	.....	.....
Galena.....	80,000	....	.....
Harker...	78,620	105,860	.....
Shullsburg.....	70,000	.....	.....
Total.....	3,031,120	576,520	720,900
Year to Oct. 23.....	111,791,205	7,412,895	11,402,730

In addition to the above there was shipped to the American Zinc Ore Separating Company, 344,390 lb. and to the Joplin Separator Works, 277,600 lb. zinc ore.

Joplin, Mo., Oct. 23—The highest price paid for zinc-sulphide ore was $53 per ton, the base price advancing to $48@50.50 per ton of 60 per cent. zinc. Zinc silicate ore sold as high as $32 on a base of $27 per ton of 40 per cent. zinc. The average price, all grades, was $45.72. Lead ore advanced $2 today, a large amount of the ore being purchased the past two days on a base price of $55 per ton of 80 per cent. lead. The average price, all grades, was $54.94 per ton.

The week opened with bidding for zinc ore at $49@49.50, but the stronger tone of the spelter market had the effect of advancing bids on Thursday to a $50 base and on Friday a large tonnage was purchased for delivery when the cars can be secured on a base of $50.50. Of the 8500 tons stock in the bins fully three-fourths is sold, and part of the remaining tonnage is not for sale on the present market. Most of the producers who were holding for a $50 market sold yesterday and today.

SHIPMENTS, WEEK ENDED OCT. 23.

	Zinc, lb.	Lead, lb.	Value.
Webb City-Carterville	4,055,280	631,940	$114,714
Joplin.....	1,461,650	195,550	40,887
Galena.....	682,210	91,670	18,905
Prosperity.....	456,440	197,820	16,394
Duenweg.....	640,040	49,590	13,702
Badger.....	411,090	5,470	10,218
Alba-Neck.....	392,900	9,580	10,080
Oronogo.....	401,110	3,860	8,870
Carthage.....	324,870	.....	8,122
Quapaw.....	334,150	11,720	7,840
Aurora.....	395,210	.....	7,746
Spurgeon.....	337,070	19,210	7,609
Sarcoxie.....	322,420	.....	5,929
Granby	408,300	10,800	5,735
Cave Springs.....	230,630	.....	5,534
Miami.....	188,880	53,940	4,883
Zincite.....	157,750	.....	3,944
Carl Junction.....	109,820	.....	2,848
Davis, Oklahoma.....	31,670	.....	570
Totals	11,341,540	1,281,150	$294,530
43 weeks.....	483,017,350	72,402,140	$11,529,314

Zinc value, the week, $259,330; 43 weeks, $9,554,530
Lead value, the week, 35,200; 43 weeks, 1,974,784

MONTHLY AVERAGE PRICES.

Month.	Zinc Ore. Base Price.		Zinc Ore. All Ores.		Lead Ore. All Ores.	
	1908.	1909.	1908.	1909.	1908.	1909.
January.....	$37.60	$41.25	$35.56	$38.46	$46.88	$52.17
February....	36.63	36.94	34.92	34.37	49.72	50.50
March.....	36.19	37.40	34.19	34.71	49.90	50.82
April	35.40	38.63	34.08	37.01	52.47	55.63
May	34.19	40.06	33.39	37.42	56.05	56.59
June.....	33.06	44.15	32.07	40.35	60.48	57.52
July	34.55	43.06	31.67	41.11	59.90	53.74
August	36.53	48.25	33.42	44.54	60.34	57.60
September ..	37.63	47.70	34.44	44.87	54.59	56.11
October.....	35.95	.....	33.28	.....	52.63	.....
November...	39.13	.....	35.02	.....	54.53	.....
December...	42.75	.....	39.63	.....	49.68	.....
Year.....	$36.63	.....	$34.31	.....	$53.93	.....

NOTE—Under zinc ore the first two columns give base prices for 60 per cent. zinc ore; the second two the average for all ores sold. Lead ore prices are the average for all ores sold.

Chemicals

New York, Oct. 27—The market, as a whole, is improving slightly, especially on contract deliveries.

Copper Sulphate—On a moderate business, prices are unchanged, at $3.95 per 100 lb. for carload lots, and $4.20 per 100 lb. for smaller parcels.

Arsenic—Trade is still slow, and quotations rather nominal. White arsenic is 2.70@2.75c. per lb. for spot, and 2.87½c. for next year deliveries.

Nitrate of Soda—Only a small business is reported, at 2.10c. per lb. for both spot and futures. Supplies are abundant.

Potash Salts—According to Berlin despatches, the Kali-Syndikat has persuaded the German government to take action to neutralize the advantage obtained by some American fertilizer companies through contracts made with mines which are now outside the syndicate. The latest despatches, however, state that the government has not decided what course to take.

Magnesite—The American Refractories Company, Chicago, Ill., announces the completion of its Austria-American magnesite works, located at Radentheim, Austria, which have been in course of construction for a year. The initial firing of the calcining kilns and starting up of the plant took place Oct. 2. It has begun operations with a yearly capacity of 60,000 tons of dead-burned magnesite.

Mining Stocks

New York, Oct. 27—In the early part of the week the general stock market showed a degree of weakness and there was some falling off in quotations. On Monday there was something of a rally, although there was no sharp advance, but the general tone was rather firmer. This did not last, however, and the close may be called uncertain. The advance in the Bank of England rate to 5 per cent. had an unfavorable effect on the other side which was reflected here. The strong feature in the market was Steel common, which held its price well to the close.

The increase in the dividend on Steel Common to 1 per cent. for the quarter, the second successive advance of ¼ per cent., was a strong card for an advance in the market, although it had been generally expected. It had a favorable effect on today's conditions.

The Curb was busy in the early part of the week, but later was less active, with a tendency to weakness. The copper stocks closed uncertainly. There was quite a decline in several Cobalt stocks, and the Nevada issues were not actively dealt in. Amalgamated Copper declared the usual quarterly dividend of 50c. a share, but this had been expected.

Boston, Oct. 26—The copper-share market continues disappointing and prices have sought lower levels during the week, as a rule. A bit of encouragement is gleaned by the persistent demand for Butte Coalition and Greene Cananea. The resumption of dividends by the former is considered significant and is thought, in a way, to be a straw showing which way the wind blows. A quarterly dividend of 25c. per share at this time, is looked upon as unprecedented, particularly in view of the fact that payments were suspended two years ago. The price advanced to $27.25 upon the declaration.

Amalgamated, after touching $84.25, broke to $79.25, although slight recovery followed the low level. Calumet & Hecla fell $22 to $640, and Tamarack broke $4.50 to $65.50 on small selling and a lack of buying orders.

Bonanza Development had a sharp advance from 52 to 80c., which is a good rise on the percentage basis. This company has sold land for agricultural purposes which will warrant a dividend of about 20c. Ten years ago the company sold land to the Santa Rita, now the Chino, which enabled the payment of a $3.50 dividend.

Curb trading has shown activity in the Ely stocks particularly. Boston & Ely was well bought up to $2.75, on knowledge that an offer had been made for a controlling interest. Union Copper rose to above $3.50 and Consolidated Arizona has been in good request up to above $1.50. Davis-Daly, First National and Ohio Copper are fractionally lower.

STATISTICS OF COPPER.

Month.	United States Product'n.	Deliveries, Domestic.	Deliveries for Export.
I	112,135,200	51,862,624	38,499,797
II	103,700,817	43,578,118	30,968,496
III	117,058,661	48,871,964	59,191,043
IV	113,574,292	47,546,010	65,110,111
V	118,356,146	61,163,325	70,542,753
VI	116,567,493	60,591,116	70,966,457
VII	118,277,603	75,520,083	75,018,974
VIII	120,597,234	59,614,207	48,382,704
IX	118,023,139	52,105,955	50,077,777
X			
XI			
XII			

VISIBLE STOCKS.

	United States.	Europe.	Total.
I	122,357,266	124,716,480	247,073,746
II	144,130,045	118,574,400	262,704,445
III	173,284,248	117,140,800	290,425,048
IV	182,279,902	115,024,000	297,303,902
V	183,198,073	114,050,320	297,248,393
VI	169,848,141	127,352,960	297,201,101
VII	154,858,061	150,928,960	305,787,021
VIII	122,596,607	171,492,160	294,088,767
IX	135,196,930	197,993,600	333,190,530
X	151,037,137	210,224,000	361,261,137
XI			
XII			

Figures are in pounds of fine copper. U. S. production includes all copper refined in this country, both from domestic and imported material. Visible stocks are those reported on the first day of each month, as brought over from the preceding month.

Monthly Average Prices of Metals

SILVER

Month.	New York.		London.	
	1908.	1909.	1908.	1909.
January	55.678	51.750	25.738	23.634
February	56.000	51.472	25.855	23.706
March	55.365	50.468	25.570	23.227
April	55.505	51.428	25.133	23.708
May	52.795	52.905	24.377	24.343
June	53.663	52.538	24.760	24.166
July	53.115	51.043	24.514	23.519
August	51.683	51.125	23.858	23.588
September	51.720	51.440	23.877	23.743
October	51.431	.....	23.725	.....
November	49.647	.....	22.933	.....
December	48.766	.....	22.493	.....
Total	52.864	.....	24.402	...

New York, cents per fine ounce; London, pence per standard ounce.

COPPER

Month.	NEW YORK. Electrolytic		NEW YORK. Lake.		LONDON.	
	1908.	1909.	1908.	1909.	1908.	1909.
January	13.726	13.893	13.901	14.280	62.386	57.688
February	12.905	12.949	13.098	13.295	58.786	61.198
March	12.704	12.387	12.875	12.826	58.761	56.281
April	12.743	12.56¼	12.928	12.93¾	58.331	57.363
May	12.598	12.893	12.788	13.238	57.387	59.338
June	12.675	13.214	12.877	13.548	57.842	59.627
July	12.702	12.880	12.933	13.363	57.989	58.556
August	13.462	13.007	13.639	13.296	60.500	59.393
September	13.388	12.870	13.600	13.210	60.338	59.021
October	13.354	.....	13.646	.....	60.139	.....
November	14.130	.....	14.386	.....	63.417	.....
December	14.111	.....	14.411	.....	62.943	.....
Year	13.208	.....	13.424	.....	59.902	...

New York, cents per pound. Electrolytic is for cakes, ingots or wirebars. London, pounds sterling, per long ton, standard copper.

TIN AT NEW YORK

Month.	1908.	1909.	Month.	1908.	1909.
January	27.380	28.060	July	29.207	29.125
February	28.978	28.290	August	29.942	29.966
March	30.577	28.727	September	28.815	30.293
April	31.702	29.445	October	29.444	.....
May	30.015	29.225	November	30.348	.....
June	28.024	29 322	December	29.154	....
			Av. year	29.465	....

Prices are in cents per pound.

LEAD

Month.	New York.		St. Louis	London.	
	1909.	1909.	1909.	1908.	1909.
January	3.691	4.175	4.025	14.469	13.113
February	3.725	4.018	3.868	14.250	13.313
March	3.838	3.986	3.835	13.975	13.438
April	3.993	4.168	4.051	13.469	13.297
May	4.253	4.287	4 214	12.938	13.225
June	4.466	4.350	4.291	12.600	13.031
July	4.744	4.321	4.188	13.000	12.563
August	4.580	4.363	4.227	13.375	12.475
September	4.515	4.342	4.215	13.125	12.781
October	4.351	.....	.....	13.375	....
November	4.330	.....	.....	13.538	....
December	4.213	.....	.....	13.156	...
Year	4.200	.....	.....	13.439	..

New York and St. Louis, cents per pound. London, pounds sterling per long ton.

SPELTER

Month.	New York.		St. Louis.		London.	
	1908.	1909.	1908.	1909.	1908.	1909.
January	4.513	5.141	4.363	4.991	20.563	21.425
February	4.788	4.889	4.638	4.739	20.875	21.563
March	4.665	4.757	4.527	4.607	21.075	21.438
April	4.645	4.965	4.495	4.815	21.344	21.531
May	4.608	5.124	4.458	4.974	19.906	21.975
June	4.543	5.402	4.393	5.252	19.000	22.006
July	4.485	5.402	4.338	5.252	19.031	21.969
August	4.702	5.729	4.556	5.579	19.360	22.125
September	4.769	5.796	4.619	5.646	19.563	22.906
October	4.801	.....	4.651	.....	19.750	..
November	5.059	.....	4.909	.....	20.875	.....
December	5.137	.....	4.987	.....	20.625	..
Year	4.726	.....	4.578	.....	20.163	....

New York and St. Louis, cents per pound. London, pounds sterling per long ton.

STOCK QUOTATIONS

NEW YORK Oct. 27 Name of Comp.	Clg.
Alaska Mine	‡.11
Amalgamated	80¾
Anaconda	45¾
Balaklala	‡2 1/16
British Col. Cop.	6⅝
Buffalo Mines	3⅛
Butte Coalition	27½
Colonial Silver	‡1/16
Cum. Ely Mining	7⅛
Davis-Daly	5⅛
Dominion Cop.	7
Douglas Copper	1⅜
El Rayo	2⅛
Florence	2⅞
Foster Cobalt	‡.32
Furnace Creek	‡.05
Giroux	8⅜
Gold Hill	⅛
Goldfield Con	6¾
Granby	‡95
Greene Gold	‡⅛
Greene G. & S.	‡9
Guanajuato	2⅜
Guggen. Exp.	215
Hanapah	‡15
Kerr Lake	8⅛
McKinley-Dar.	.85
Miami Copper	15½
Micmac	⅛
Mines Co. of Am.	1/16
Montezu. of C. R.	17
Mont. Sho. C.	1⅜
Nev. Utah M. & S.	1¼
Newhouse M. & S.	2⅞
Nipissing Mines	11¼
Old Hundred	⅛
Silver Queen	.34
Stewart	1/16
Tennessee Cop'r.	33½
Tri-Bullion	⅞
United Copper	9⅛
Utah Apex	‡1⅛
Utah Copper	46
Yukon Gold	4 1/16

‡Last quotation.

BOSTON Oct. 27 Name of Comp.	Clg.
Adventure	5
Allouez	54
Am. Zinc	34¾
Arcadian	4
Arizona Com.	43¼
Atlantic	10
Boston Con.	13⅛
Calumet & Ariz.	97
Calumet & Hecla	640
Centennial	37
Copper Range	78½
Daly-West	8
East Butte	10½
Franklin	16
Greene—Can.	10¾
Hancock	11
Isle Royal	24⅜
Keweenaw	2¼
La Salle	14¼
Mass.	5⅛
Michigan	6
Mohawk	59
Nevada	23¾
North Butte	56½
Ojibway	‡8
Old Colony	.50
Old Dominion	.49
Osceola	150
Parrot	29
Quincy	85
Rhode Island	‡⅛
Shannon	15⅛
Superior	57
Superior & Bost.	13⅞
Superior & Pitts.	15¼
Tamarack	67
Trinity	10
U. S. Smg. & Ref.	53
U.S.Sm. & Re., pd.	52¼
Utah Con.	42
Victoria	3¼
Winona	6½
Wolverine	‡148
Wyandotte	2

‡Last quotation.

N. Y. INDUSTRIAL	
Am. Agri. Chem.	45¼
Am. Smelt. & Ref.	94⅝
Am.Sm. & Ref., pf.	111⅛
Colo. Fuel & Iron.	44¾
Federal M. & S.,pf.	‡80
National Lead	86¼
National Lead, pf.	110½
Pittsburg Coal	21⅜
Republic I. & S.	44⅜
Republic I. & S.,pf.	104
Sloss-Sheffield	‡92¾
Standard Oil	‡685
U. S. Steel	87
U. S. Steel, pf.	126¼
Va. Car. Chem.	46

BOSTON CURB	Low.
Ahmeek	200
Chemung	16½
Chino	7⅜
Gila	7½
Indiana	6½
Mason Valley	1⅞
Ray Central	2⅛
Ray Con.	17⅝
San Antonio	8
Yuma	1¾

Furnished by Hornblower & Weeks, N. Y.

ST. LOUIS Oct. 23 N. of Com.	High.	Low.
Adams	.40	.30
Am. Nettie	.09	.07
Center Cr'k	1.75	1.50
Cent.C.& C.	85.00	84.00
C.C. & C. pf.	84.00	83.00
Cent. Oil	110.00	100.00
Columbia	9.00	7.00
Con. Coal	18.00	17 00
Doe Run	115.00	105.00
Gra. Bimet.	.25	.23
St. Joe	12.50	11.00

LONDON Oct. 27 Name of Com.	Clg.
Dolores	£1 5s 0d
Stratton'sInd.	0 3 3
Camp Bird	1 7 9
Esperanza	2 18 0
Tomboy	0 19 6
El Oro	1 6 0
Oroville	0 11 9

Cabled through Wm. P. Bonbright & Co., N. Y.

NEVADA STOCKS. Oct. 27.

Furnished by Weir Bros. & Co., New York.

Name of Comp.	Bid.
COMSTOCK STOCKS	
Belcher	1.45
Best & Belcher	.83
Caledonia	.65
Challar	.27
Comstock	‡.33
Con. Cal. & Va.	1.70
Crown Point	1.15
Exchequer	.43
Gould & Curry	.30
Hale & Norcross	.65
Mexican	1.90
Ophir	2.20
Overman	.64
Potosi	.63
Savage	.58
Sierra Nevada	.73
Union	.95
Utah	.14
Yellow Jacket	1 50
TONOPAH STOCKS	
Belmont	.68
Extension	.48
Golden Anchor	...
Jim Butler	.11
MacNamara	.27
Midway	.16
Montana	.82
North Star	.02
Tono'h Mine of N.	6.62½
West End Con.	.22
GOLDFI'D STOCKS	
Adams	.01
Atlanta	.11
Blue Bell	.02
Booth	.10
C.O.D. Con.	.06
Columbia Mt.	.06
Comb. Frac.	.60
Cracker Jack	.01
Dia'dfield B. B. C.	.01
Florence	2.62½
Goldfield Belmont	.04
Goldfield Daisy	.08
Great Bend	.03
Jumbo Extension	.13
Kendall	.02
Lone Star	.02
May Queen	.04
Oro	.03
Red Hill	.03
Sandstorm	.05

Name of Comp.	Bid.
Silver Pick	.10
St. Ives	.04
Triangle	.01
BULLFROG STOCKS	
Gibraltar	.02
Homestake King.	‡.01
Mont. Shoshone C.	1.25
Tramp Cons.	.04
MISCELLANEOUS	
Cumberland Ely.	7.12½
Giroux	8.62½
Greenwa'r Copper	.05
Nevada Con.	24.00
Nevada Hills	.65
Navada Smelting.	.75
Nevada Wonder	.55
Nevada-Utah	1 50
Penn-Wyoming	...
Pittsburgh S. Pk.	60
Ray Central	2.43¾
Ray Con.	17.25
Round Mt. Sphinx	.05

COLO. SPRINGS Oct. 22 Name of Comp.	Clg.
Acacia	.07¼
C. C. Con.	‡.03
Doctor	.08
Elkton	.71¾
El Paso	.62½
Findlay	.10½
Gold Dollar	.10⅞
Gold Sovereign	.04⅛
Isabella	.17⅛
Jack Pot	‡.08¾
Jennie Sample	.07⅝
Jerry Johnson	.07¼
Lexington	‡.01¾
Mary McKinney	.48
Old Gold	.04
Pharmacist	.03½
Portland	.85
U. G. M.	.07¼
Vindicator	.68¼
Work	.06½

Assessments

Company.	Delinq.	Sale.	Amt.
Alameda M. & M., Ida	Oct. 7	Nov. 4	$0.005
Alpha, Nev	Nov. 11	Dec. 7	0.05
Belcher, Nev	Nov. 9	Nov. 30	0.10
Caledonia, Nev	Oct. 21	Nov. 11	0.10
Chollar, Nev	Nov. 8	Dec. 1	0.10
Gold Mt., Utah	Sept. 15	Nov. 15	0.0025
Gould & Curry, Nev	Oct. 28	Nov. 17	0.10
Hypothek, Ida	Sept. 30	Dec. 1	0.005
Idaho North Star, Ida	Oct. 23	Nov. 15	0.01
Julia Con., Nev	Oct. 14	Nov. 8	0.03
Missoula Copper, Ida	Oct. 4	Dec. 6	0.01
Overman, Nev	Nov. 9	Nov. 30	0.10
Pawhattan, Ida	Oct. 7	Nov. 8	0.001
Potosi, Nev	Nov. 12	Dec. 6	0.10
San Antonia Copper, Mex	Dec. 1	.....	1.00
Savage, Nev	Nov. 10	Dec. 1	0.10
Sierra Nevada, Nev	Oct. 12	Nov. 3	0.10
Silver Queen, Utah	Oct. 7	Nov. 15	0 0025
United Silver-Lead, Ida	Sept. 21	Nov. 20	0.001
St. Louis, Nev	Oct. 22	Nov. 12	0.01
Utah, Nev	Oct. 26	Nov. 16	0.05